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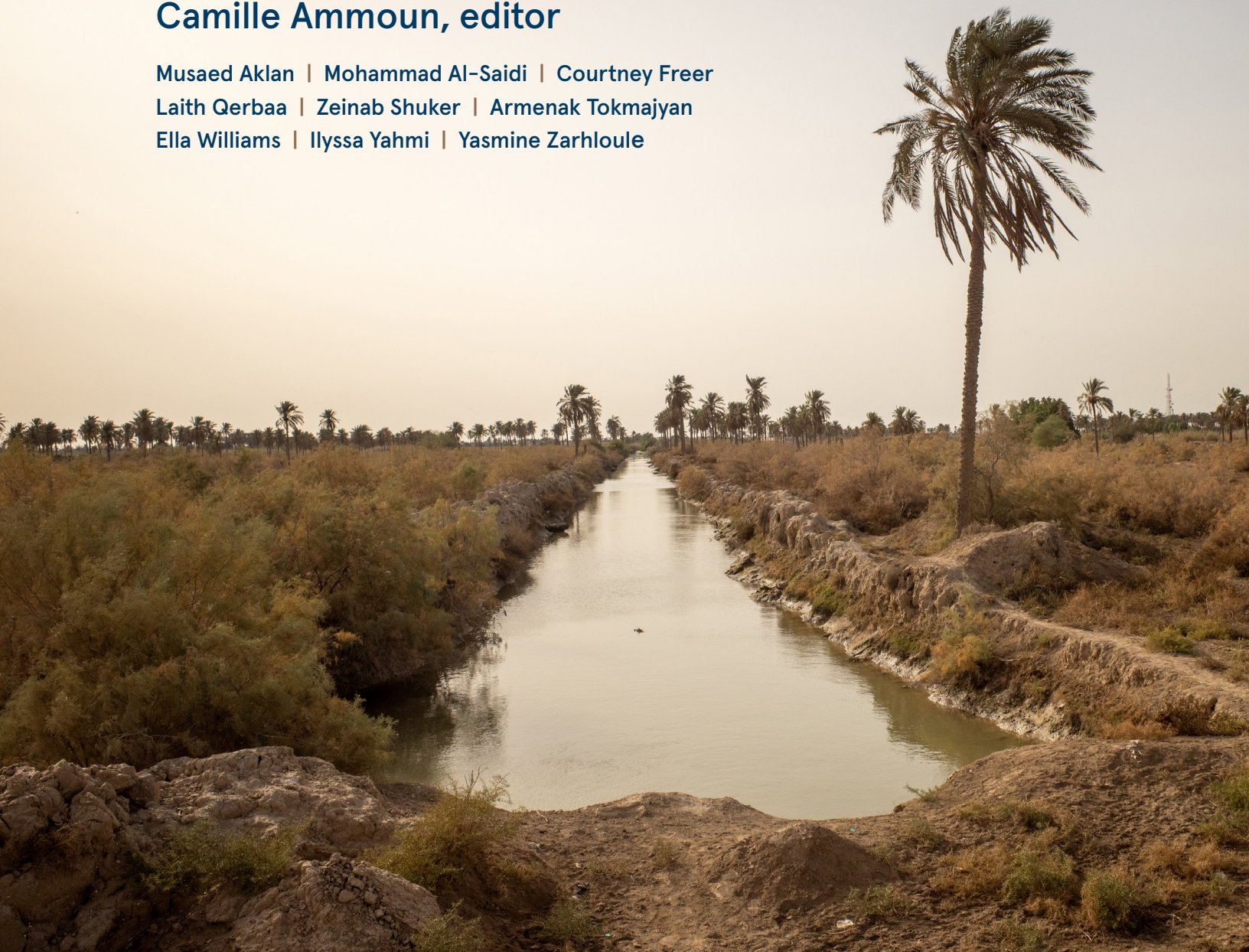

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Introduction: Beyond Climate Displacement

Camille Ammoun

Climate change does not occur in isolation. Across the Middle East and North Africa, climate stress interacts with economic fragility, governance failures, social marginalization, and conflict. This dynamic constitutes a convergence trap, or a condition in which interlocking crises reinforce one another in ways that steadily diminish people's options when it comes to adapting locally, moving safely, or remaining in place with dignity.

Because decisions involving mobility emerge from this convergence, the relationship between climate change and human displacement remains conceptually and legally unresolved. From voluntary to forced migration, the climate-induced movement of individuals and groups unfolds along a continuum. For some communities, it takes the form of fragmentation within the same general geographic area, seasonal migration to areas farther afield, or permanent relocation—whether within or across national borders.

For others, it produces the opposite condition: the inability to leave. That is, the often-overlooked condition of forced immobility. These communities are the most vulnerable, as they find themselves trapped in deteriorating environments, cut off from adequate public services, and excluded from effectual policy responses. Immobility becomes the handmaiden of economic decline and subsistence living.

Climate impacts can therefore be central or marginal, dramatic or subtle. They can displace communities or trap them in immobility and push them down the socioeconomic ladder. For these reasons, there is no legally recognized status, or any widely accepted definition, of what is often called a climate refugee.

This compendium examines the convergence trap of climate change through studies of five communities across the Middle East and North Africa: the Ait Khabbash in southeastern Morocco; Bedouin communities in Deir al-Kahf in northeastern Jordan; the Bidun in Kuwait; Afro-Iraqis in southern Iraq; and Kabyle farmers in Algeria's Oued

Sahel-Soummam Valley. These cases are illustrative of a broader regional condition in which climate-wrought change is filtered through histories of marginalization, uneven state formation, exclusionary governance, and constrained mobility.

Yasmine Zarhloule and Ella Williams capture the trajectory of the Ait Khabbash through what they term intersecting vulnerabilities. Historically a nomadic pastoralist community in southeastern Morocco, the Ait Khabbash long structured their livelihoods around oasis agriculture, movement, and grazing their flocks across the border with Algeria. But this mobility has been progressively constrained by overlapping political and environmental pressures. Colonial territorial control, later reinforced by post-independence border securitization and recurrent closures between Morocco and Algeria, restricted access to grazing lands and severed older patterns of circulation. Concurrently, recurrent droughts, groundwater over-extraction, and large-scale hydraulic infrastructure have degraded oasis ecosystems.

Armenak Tokmajyan and Laith Qerbaa show how Bedouin communities in Deir al-Kahf have faced a comparable layering of constraints. Initially well-integrated into the nascent Jordanian state through sedentarization, military service, public-sector employment, and agricultural schemes, these communities saw their mobility curtailed by the growing consolidation of the Syrian-Jordanian border, which increasingly confined them within a single national framework and disrupted older grazing routes. Border controls were further tightened following Syrian-Jordanian hostilities and the Jordanian army's clashes with Palestinian groups at the beginning of the 1970s. More recently, this legacy has converged with declining public-sector opportunities, the rise of capital-intensive development favoring external investors, and growing climate stress, particularly rising temperatures and reduced rainfall.

Courtney Freer highlights a different form of marginalization among the Bidun in Kuwait. A large population of lifelong yet stateless residents, the Bidun embody an urban and legal vulnerability in which climate exposure intersects with administrative exclusion. In a wealthy rentier state increasingly exposed to extreme heat, electricity shortages, and infrastructure stress, their lack of citizenship limits their access to rights, services, secure housing, and political representation. Their case is less about displacement in the conventional sense than about internal exclusion: a condition in which people remain physically present but politically and administratively invisible.

Zeinab Shuker examines Afro-Iraqis in southern Iraq through a similar lens. For this historically marginalized community, climate change operates as a threat multiplier, compounding a long history of racial and socioeconomic exclusion rooted in slavery and sustained by social stigma, underrepresentation, and limited access to resources. Concentrated in low-income occupations that are often looked down upon, and frequently lacking the networks and capital needed to move or adapt, Afro-Iraqis are disproportionately exposed to rising temperatures, deteriorating water quality, pollution, and the wider environmental crisis affecting Basra and southern Iraq.

Ilyssa Yahmi examines Kabyle farmers in Algeria's Oued Sahel-Soummam Valley through the lens of mutually reinforcing cycles of adaptation and degradation. What she terms the adaptation paradox captures how responses to climate stress, shaped by institutional failures and market pressures, can accelerate the very environmental degradation they seek to manage. In this case, the overuse of water reflects the weakness of mechanisms to share resources in times of scarcity: individual incentives to secure short-term survival undermine collective sustainability. Adaptation and degradation therefore feed into one another, intensifying ecological stress, weakening rural livelihoods, and fragmenting social life.

Taken together, these five cases show that human mobility, and immobility, cannot be understood through climate variables alone. The dynamics at play are sharpest where vulnerability is layered upon marginalization. Among the Ait Khabbash in Morocco, women bear the heaviest burden of environmental change, as the erosion of nomadic life intensifies labor, isolation, and social fragmentation. In Yemen, the *Muhammasheen*, literally "the marginalized," embody a long-term exclusion in which stigma, legal invisibility, conflict, and environmental exposure intertwine, trapping communities in deprivation that predates climate stress but is deepened by it. Around Lake Qaraoun in Lebanon, drought, pollution, economic collapse, governance failures, and conflict all reinforce one another, narrowing avenues for both adaptation and safe mobility.

The world's most vulnerable communities, marginalized and sometimes muzzled, may not describe their condition as part of a global polycrisis. Yet that is what it is. These communities live at the sharp edge of the convergence trap, which has climate change at its core. It reaches them through failed harvests, degraded ecosystems, rising food prices, closed borders, economic fragility, governance failures, social marginalization, geopolitical tensions, and conflict. The overheating of the planet is entangled with each of these pressures, reshaping livelihoods, depleting shared resources, deepening inequalities, and driving both displacement and forced immobility.

The main policy challenge stemming from all these situations is to alleviate the effects of the convergence of pressures making displacement more likely, adaptation less viable, and immobility more dangerous. This requires moving beyond sectoral approaches that treat water, agriculture, migration, urban planning, social protection, citizenship, and climate adaptation as separate policy domains. It also requires recognizing that mobility itself is not always a failure. Ultimately, migration can be a form of adaptation—so long as it is safe, voluntary, and supported.

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Between Marginalization and Climate Change: The Resilience of Morocco's Ait Khabbash

Yasmine Zarhloule and Ella Williams

Introduction

As climate change intensifies, its impact is felt most acutely by the world's marginalized communities, where drought, irregular rainfall, and ecological degradation intersect long histories of political and economic neglect. This is very much the case in the desert regions of North Africa inhabited by indigenous communities. For the Ait Khabbash, traditionally nomadic Amazigh pastoralists in Morocco's Draa-Tafilalet region, environmental change exacerbates long-standing inequities rather than simply creating new challenges. Their experiences illuminate a fundamental tension: while Morocco is lauded internationally as a climate leader, particularly for its renewable energy investments, its policies have been less effective in addressing the vulnerabilities of communities most exposed to climate change.

One way the Ait Khabbash have responded to challenges has been by migration. Over the past several decades, the Ait Khabbash have transitioned from nomadic livelihoods along the Morocco–Algeria border to sedentary settlement in villages such as Merzouga and Hassilabied, relocation to the urban centers of Ouarzazate and Marrakesh, and international migration to France and Spain.

More recently, the community has turned to building a tourism industry in its region from the ground up. On the one hand, this exemplifies how indigenous groups adapt to structural exclusion and ecological stress. Yet, on the other, the Ait Khabbash's experiences lay bare the blind spots of state-centered climate policy frameworks—which often overlook indigenous knowledge and non-state adaptation. While grassroots adaptation strategies underscore the resilience of this marginalized community, initiatives developed outside the framework of

A small house on the outskirts of Hassilabied. Some families reside in both a tent and a house, alternating between the two.

A traditional tent, woven from camel and goat hair. Traditionally made by women, such tents can take twelve months to complete.

state support remain highly vulnerable to economic shocks. Many desert tourism enterprises operate on a cash basis, without formal registration, rendering them ineligible for state support packages during crises, such as the COVID-19 pandemic.

As climate-related impacts intensify, these businesses may face comparable disruptions, further exposing the precarity of informal adaptation strategies. Consequently, community members' lives are marred by entrenched inequalities and uncertainty for the future. To tackle climate-related challenges, improve state-society relations, and arrive at solutions that place the Ait Khabbash at their center, what is needed are strategies focused on trust-building, participatory mechanisms, sustainable practices, and cultural preservation.

The Ait Khabbash: Intersecting Vulnerabilities

The Ait Khabbash are a segment of the Ait Atta tribe, which is part of the wider Amazigh ethnic group. They have historically lived in the harsh desert climate and unforgiving landscape of southeastern Morocco and west-central Algeria, specifically the area surrounding the Tafilalet oasis. Here, in a place where water is life—*aman iman,* in Tamazight—the annual level of rainfall ranges from a few inches to less than an inch. For centuries, the Ait Khabbash have used a system that blends ecological knowledge with community cooperation to utilize and conserve water. They would also migrate seasonally in search of grazing land for their livestock. Over the past two hundred years, however, the community's mobility has been increasingly constrained, and in recent decades their access to water has diminished.

Restrictions on mobility began with France's occupation of Algeria in 1830. The French denied the Ait Khabbash access to some of their winter pastures and also periodically prevented them from engaging in the caravan trade. Restrictions on Ait Khabbash mobility continued after Morocco and Algeria gained independence from France—in 1956 and 1962, respectively—largely due to recurrent tension between the two countries. Repeated border closures and militarization curtailed access to pastures, driving people to sedentarization. Successive droughts in the 1970s, 1980s, and 1990s accelerated this process; many families gave up nomadism and settled in the towns of Rissani and Erfoud, as well as the larger cities of Ouarzazate and Marrakesh. These migrants sought work in construction, mining, or the military. Today, only a small percentage of Ait Khabbash families remains fully nomadic.

And then there is the matter of water scarcity. Already an arid environment, Draa-Tafilalet is experiencing reduced precipitation, intensified droughts, and heightened water scarcity. (Drought has contributed to the death of an estimated two-thirds of Morocco's 14 million date palms over the past century.) Between 1970 and 2020, most regions in Morocco experienced a precipitation decrease of 4–5 percent per decade. In regions where the average annual rainfall is less than 80 millimeters, evapotranspiration—the transfer process of water from land to the atmosphere via evaporation and plant transportation—is one of the most important factors of water depletion. In interviews,[1] members of the Ait Khabbash community noted that while the area has always been arid and subject to a harsh climate, periods of drought are now noticeably longer and more severe. Water is also scarcer: In interviews with the author, Ahmad,[2] a nomad who runs a small, off-grid desert inn, mentioned that whereas they used to find water 8 meters below ground, now some people are having to dig as deep as 120 meters.

Environmental challenges in Morocco cannot be fully understood without considering governance—whether related to water privatization, the enforcement of environmental laws, or the continued marginalization of local voices and territories. For example, state-sponsored irrigation schemes centered on large dams that favor large-scale industrial agriculture serve to exacerbate climate-induced droughts. The Hassan Addakhil dam, constructed upstream of the Tafilalet Oasis on the Ziz River around Errashidia in 1971, and the Mansour Eddahbi dam, constructed in 1972, illustrate as much. Although intended to increase water reserves and control extreme flooding, these two dams have had a negative ecological impact, disrupting the feeding of downstream water tables and reducing soil fertilization. Coupled with over-extraction by motorized pumps, the building of large dams has led to reduced water for irrigation and the decline of oases ecosystems, which in turn has caused the desertification of land.

As a result of all this, pastoralism, once the core of the Ait Khabbash's identity and economy, is increasingly unsustainable as a livelihood. Shrinking pastures and recurrent droughts push families to sell livestock, migrate, and sometimes abandon nomadism altogether. The lack of infrastructure such as schools or hospitals in remote areas has contributed to people's

A motorized pump that uses solar power to generate electricity. With more people opting for solar panels, such pumps can be found across Morocco.

decision to settle permanently in urban centers. At the same time, education, migration, tourism, and especially social media have exposed the Ait Khabbash to urban lifestyles, shaping aspirations among the youth. Whereas elders recall an existence much of which revolved around seeking freedom and the well-being of their livestock, younger generations are increasingly drawn to mobility, financial stability, and material possessions.

Migration from the Draa-Tafilalet to Europe started in the 1960s, with French agents recruiting workers for coal mines. Migration has predominantly been to France and, to a lesser extent, the Netherlands and Belgium. Remittances from the diaspora, along with mutual aid within the community, have been crucial in shaping the transition of the Ait Khabbash from nomadism to sedentarism and facilitating their coping strategies. The community's networks stretch across Morocco, with strong concentrations in the southeastern cities and Marrakesh. Migrants often follow established Ait Khabbash routes, taking jobs within their networks' businesses in Marrakesh, Ouarzazate, and Rissani.

Today, international migration is limited, as border securitization and perilous journeys across the Mediterranean make it increasingly difficult to reach European shores. Yet internal migration, directed to the big cities along the Atlantic coast or within the region (Marrakesh, for example) remains important. The development of villages into small and medium-sized urban centers has opened pathways to non-agricultural employment. Additionally, closer to home, many households have reoriented their coping strategies. This has translated into their building a resourceful and locally driven tourism industry spanning desert camps and guesthouses, as well as tourist guiding and transport services.

Grassroots Economic Development in Draa-Tafilalet

In recent years, members of the Ait Khabbash have constructed a tourism sector from the ground up, one centered on desert camps. The latter are seasonal encampments of tents, set up near sand dunes, that offer treks, meals, and overnight stays. They are distinct from the area's guesthouses and small hotels, which are mostly permanent buildings, oftentimes located farther away from the sand dunes. Both types of facilities are built by local families and networks, which rely on community aid and remittances whenever possible; little state planning or investment is involved. The result is a thriving industry in a region that, previously, was seldom visited by international tourists.

These initiatives have provided thousands of jobs for members of the community, kept families together, and enabled them to remain closely tied to their ancestral lands. Indeed, whereas migration often disrupts intergenerational knowledge transmission, alters social structures, and produces feelings of cultural loss, homegrown economic projects facilitate cultural continuity and maintain a form of communal cohesion. Nevertheless, the desert camps, which are water-intensive, remain vulnerable to climate change and global shocks.

The first municipal hostel was set up in Merzouga in 1975. In the early years, local families offered tea, camel treks, and simple bivouac tents in the dunes to the few tourists visiting the region. International tourism in Draa-Tafilalet took off in the late 1980s. By the early 2000s, spurred by new infrastructural developments such as electricity, drinking water, internet networks, and roads linking Rissani to smaller towns, it had become a multi-million dollar industry. Alongside dune excursions, a "sandbath" practice (psammotherapy, or *defna* in Moroccan Arabic), touted for its health benefits, also grew in Hassilabied and Merzouga, drawing visitors largely from northern Morocco. Driven mostly by nomadic families who set up the first local tourist agencies, as well as migrants who returned home, the sector expanded from modest tents into a mix of larger camps, luxury bivouacs, and guesthouses. Despite the 2006 Merzouga floods, which caused significant damages to the infrastructure, locals rebuilt quickly.

Most touristic activities are located around Ouarzazate, as well as in Merzouga and Hassilabied. Restaurants as well as businesses renting out motorcycles and sports utility vehicles for off-roading are also to be found. Foreign tourists make up most visitors to the camps and hotels: in 2018, two-thirds of arrivals in the country visited Ouarzazate, with 23 percent going to Errashidia Province. In 2025, the first edition of Draa-Tafilalet Days, a festival meant to showcase the region's tourism capacity, took place.

The transition from nomadism to tourism usually relies on one person of a household, the elder son for example, moving to a nearby town with camels or working in a hotel before being joined by remaining family members. Hassan began life as a nomad in Rifai, moving between Tafraout, Mharesh, and back home during the winter months. In 2004, when he was in his early twenties and his siblings were old enough to look after the family's camels, Hassan moved to Hassilabied in search of employment. His relocation was enabled by

an uncle, who helped him find work rehabilitating palm groves. Later, another relative helped him secure a job as a camel-driver for tourists at a hotel in the town. Over time, his brothers joined him in order to establish a temporary desert camp in the area. As bookings multiplied, and the desert camp tourism industry in general grew, they sold their remaining camel stock to build a permanent site, and before long the rest of the family joined them.[3]

In the same vein, women have carved out a space for themselves in the tourism sector, albeit a smaller one. Oftentimes, they do this through cooperatives, which are jointly owned organizations through which members pool resources and share profits. In Hassilabied, for example, a women's cooperative operates to produce traditional biscuits and sweets to supply several desert camps.[4] Such cooperatives help women secure livelihoods by converting household skills into market and capital access. This enables them to collectively coordinate labor, maintain the social bonds that underpin community, and integrate women into the tourism industry.

Although tourism offers the Ait Khabbash community an avenue of livelihood diversification, the sector is intricately tied to climate change, and thus remains vulnerable. Indeed, with camps often requiring water for facilities such as swimming pools, desert tourism is dependent on a scarce resource. Tourism is also susceptible to global shocks, as illustrated by its worldwide collapse during the COVID-19 pandemic. Many Ait Khabbash community members who had transitioned to tourism were left jobless overnight, some returning temporarily to nomadism or agriculture.

Ultimately, while the Ait Khabbash's turn toward carving out a tourist sector in the desert embodies resilience, it also carries costs. In interviews, many community members expressed sadness at the erosion of traditional nomadic life and lifestyles. Adaptation, even when it includes resilience, may involve cultural erosion or heightened vulnerability, raising critical questions about what constitutes success. Moreover, in this case, adaptation alone cannot offset the structural vulnerabilities produced by prolonged droughts, declining pastures, and irregular access to services. These dynamics of resilience-amid-precarity highlight the disjuncture between local strategies and national policy frameworks, an issue sharpened by the state's uneven presence in Morocco's desert.

The Ait Khabbash and the Moroccan State

Despite hosting flagship economic projects, the Draa-Tafilalet region suffers from inadequate infrastructure, poor services, and minimal state investment in social development. Local non-governmental organizations (NGOs) fill some critical gaps—for example, by restoring palm groves or drilling solar-powered wells—but these interventions remain piecemeal and limited in scale. Neither NGO projects nor the adaptation strategies pursued by members of the Ait Khabbash (whether individually or collectively) suffice to compensate for the compounded impact of climate change and socioeconomic exclusion.

Draa-Tafilalet embodies the paradoxes of Morocco's developmental trajectory. Despite being resource-rich, with extensive silver and mineral deposits, and even though it hosts the Noor solar plant, one of the world's largest concentrated solar facilities, the region remains one of Morocco's poorest. It contributes less than 1 percent of national gross domestic product, while its poverty rate (14.6 percent) and vulnerability index (16.2 percent) exceed national averages. According to the Haut-Commissariat au Plan's poverty map, in 2024 Draa-Tafilalet recorded a poverty rate of 7.7 percent—higher than the national average of 6.8 percent. In fact, the combined incidence of poverty and vulnerability reached its highest rate nationally in the region, at 19.5 percent.

This is due to a combination of factors, including low levels of schooling, limited access to healthcare, and difficult living conditions marked by poor access to basic services and infrastructure (water, electricity, communication, sanitation, and housing). These socioeconomic pressures converge with a rapidly deteriorating ecological base, amplifying the fragility of traditional livelihoods. Addressing such structural pressures entails a negotiated state-society compact that is calibrated to the region's needs. For the state, such engagement would mitigate rural-urban displacement, preserve landscapes and tourism assets, and reduce the costs associated with recurrent climate shocks. For local communities, it would anchor adaptation strategies in more predictable and long-term support.

Widespread community disengagement from the state, with a legacy of historical neglect and memories of authoritarian repression, has fostered autonomy but hindered integration. For example, some desert camps are unregistered, and therefore ineligible to receive state assistance in times of hardship. Many Ait Khabbash prefer self-reliance through community networks, as opposed to engagement with state programs. Indeed, the majority of Ait Khabbash do not make use of the banking system; even though government grants are available for tourism projects, most members of the community choose not to take them. In an interview, Omar, an owner of a desert camp, said, "We would rather borrow money from someone in the community [than accept a government grant]."[5] Recognizing these dynamics raises critical questions: how can climate governance frameworks integrate marginalized voices, respect indigenous practices, and overcome legacies of distrust?

First, trust-building through participatory decisionmaking is vital to bridging the gap between local adaptation and national economic frameworks. Ideally, this would take the form of community-led climate councils and decentralization—thereby ensuring the transparent allocation, distribution, and use of resources at the local level. In 2015, Morocco announced plans for *régionalisation avancée*, or advanced regionalization, a process of decentralization that would involve transferring power, responsibilities, and resources away from the central government and toward local authorities. While its implementation has so far been challenging and sporadic, decentralization still has the potential to encourage the development of integrated policies that attend to the specificities of each region.

For participatory mechanisms to be accessible to local communities in practice, they must be accompanied by concerted efforts to produce and transmit politics in local languages. In Draa-Tafilalet, the introduction of Tamazight would support communities' engagement in designing and implementing policies that align with their needs. Civil society, NGOs, and research networks can play a key role in facilitating this process. Focusing on access through local languages is a necessary step to shift participation from an ephemeral box-ticking exercise into co-production, whereby communities are able to shape policy.

Secondly, it is imperative to bolster the sector's resilience to shocks caused by natural disasters and crises and provide social protection mechanisms for workers. One way to help achieve both these objectives is through building capacity for domestic tourism, which would reduce reliance on international tourists. This entails diversifying services and products (through cultural programming and multi-day circuits, for example), as well as strengthening existing infrastructure such as waste management, road access, and off-grid power. Upgrading what is on offer would provide a stable base to build on what the community has achieved. Importantly, however, these steps need to be integrated within national frameworks.

Relatedly, indigenous knowledge systems that embody centuries of adaptation to arid environments can complement modern practices and new technologies. This is particularly true for maintaining oases—which are both a key pillar for sustenance and an under-utilized tourism asset. The Ait Khabbash have historically made use of the *khettara*, an age-old cooperative practice whereby a series of tunnels tap into groundwater and channel it to the surface for irrigation. Unlike modern wells equipped with motorized pumps, the khettara cannot exhaust non-renewable fossil water from deep aquifers. For centuries, it enabled the Ait Khabbash to withstand water scarcity. The preservation of the khettara and other systems is vital for trust-building and livelihood diversification. National strategies should evaluate their scalability and integration into nationwide frameworks for the preservation of the environment.

Together, these elements can strengthen state-society relations, sustain traditional livelihoods, and ensure that costs and benefits are borne fairly and equitably across communities. For climate governance to be just and durable, it must rest on trust-building, participatory mechanisms, and the integration of indigenous knowledge into policy frameworks. Supporting grassroots initiatives, protecting cultural heritage, and ensuring equitable access to resources is not only a matter of social justice. It is also a practical necessity for sustainable adaptation in arid regions.

In the *khettara* system—which has seen a revival in Hassilabied since the early 2000s, thanks to cooperation between local NGOs and the United Nations Development Programme—land is divided between members of the community, who often grow vegetables and date palms.

Conclusion

As climate impacts intensify, relying solely on grassroots resilience without structural support would deepen existing inequalities and expose informal sectors to repeated shocks. At the same time, however, the Ait Khabbash case points to the urgent need for climate policies beyond centralized, top-down methods. Marginalized communities must be meaningfully engaged with and integrated as partners in adaptation frameworks. National strategies should invest in participatory governance mechanisms, strengthen social protection systems, and integrate indigenous knowledge into climate planning. Building trust through inclusive decisionmaking, improving infrastructure, and supporting locally driven economic initiatives can transform adaptation from a reactive, fragmented process into a proactive, equitable framework—one that safeguards both livelihoods and cultural heritage while advancing national climate goals.

02

Raining Stones: Deir al-Kahf's Bedouins and the Impact of Climate

Armenak Tokmajyan and Laith Qerbaa

Introduction

East of Irbid, northern Jordan's largest city, begins the arid and semi-arid Northern Badia district. Along the road to Baghdad, before reaching the city of Mafraq, a late spring breeze gives way to scorched wheat fields that have withered before ripening, with small wild shrubs clinging to life. As one plunges deeper into the desert, the terrain changes. Brown earth becomes flecked with small black basalt rocks, as if the sky had rained stone. However, it isn't the rocks that seem out of place, but the bursts of green: grapevines and peach orchards, cultivated patches of land defying the aridity, irrigated by underground water. Nearly two-hours out of Irbid, one reaches scattered villages making up the Deir al-Kahf subdistrict of Mafraq Governorate, home to some 15,000 people, settled descendants of nomadic or seminomadic Bedouins living on Jordan's periphery near the border with Syria.

Near Deir al-Kahf, a dry landscape stretches out, as if the sky once rained basalt stones, Northern Badia, Mafraq Governorate, Jordan

Deir al-Kahf Village, Northern Badia, Mafraq Governorate, Jordan

The remote desert region offers an instructive illustration of how overlapping economic, environmental, and climate-related factors are reshaping Northern Badia's socioeconomic landscape. The settlement of Bedouins, those of Deir al-Kahf included, was central to the formation of the Jordanian state and its northern and eastern borders. From the Mandate period (1921–1946) until Jordan's independence, and especially after 1970, this process reshaped local economies when the state greatly expanded its hiring among the population and encouraged agricultural development projects that encompassed the semi-arid steppes east of the Hijaz railway.

However, in the past decade the impact of climate change, particularly rising temperatures, has become clearly perceptible. Even the more optimistic projections are deeply troubling, threatening to render an already neglected land increasingly inhospitable. Climate has long influenced the region, transforming a dominant nomadic lifestyle from as early as the 1920s. The decline in state employment opportunities and the fact that capital-intensive, export-oriented development projects largely favored external investors, with little concern for creating local jobs or protecting natural resources, have left residents facing increasingly difficult choices, which will only intensify migration to Jordan's cities.

From Desert Roamers to State Employees

Displacement is usually cast as a grim coping strategy for settled communities, uprooting them from their livelihoods and landscapes. For seminomadic groups, however, the inverse can be true: settlement can be a form of adaptation. Beginning in the 1920s and after decades of resisting settlement under Ottoman rule, most Bedouin communities in Jordan's steppes gradually exchanged their tents for stone houses in response to opportunities provided by the state, harsh climatic episodes, and the state's steady advance into desert life. This led the communities to replace pastoral and agropastoral pursuits with state employment and subsidies, as well as integration into state-backed development schemes.

That transformation was well-captured by the formation of the Jordan-Saudi border in the 1920s, which coincided with a near-decade-long drought beginning in the middle of the decade.[6] The drought eroded the Bedouin communities' resilience, while the forces of Abdel-Aziz Al Saud, who became king of Saudi Arabia in 1932, carried out repeated raids and eventually imposed a border accepted by the British Mandatory power in 1925. These two factors depleted the Bedouins' livestock and placed the region's most important grazing land, the Sirhan Valley with most of its permanent wells, inside Abdel-Aziz's territory, making it off limits to Bedouin tribes on the Jordanian side (see Map 1). This pushed many tribes, even those that were well-off, to the brink of starvation.[7]

The damage done to the Bedouin communities was the Jordanian state's gain.[8] In 1930, John Bagot Glubb, then the commander of the Desert Patrol, a force made up primarily of Bedouin, was tasked with stabilizing the frontier with the emerging Saudi kingdom and securing a vital link between Palestine and Iraq, both under British Mandate. Glubb's "militarized welfare" combined recruitment into his new force with handouts, seed loans, sheep, and occasional paid work. This rescued Bedouin communities from economic collapse, prevented defections to Abdel-Aziz's forces, and curbed cross-border raids. Over time, Glubb integrated seminomadic tribes into the Mandatory state, now centered on Amman. In doing so, he laid the foundations of a social contract between the center and tribal peripheries—an enduring pact that saved the Hashemite monarchy in many crises.[9]

The Syrian-Jordanian border's formation had a similar impact in confining Bedouin communities within a national framework and disrupting their grazing areas. When Britain and France drew the border between their Mandates in 1932, Northern Badia was cut off from Suwayda, where Deir al-Kahf's Bedouins, among other Bedouin communities, grazed their herds before returning to Jordan in winter. However, there was weak enforcement of cross-border grazing, which continued until 1970, when controls were tightened after Syrian-Jordanian hostilities following the Jordanian army's clashes with Palestinian groups.[10]

Physiographic Regions of Jordan and Selected Grazing Lands.

This map examines the physiographic regions of Jordan and their spatial relationship to two grazing lands discussed in the article.

The base layer, derived from **Myriam Ababsa's *Atlas of Jordan: History, Territories and Society* (2014)**, delineates the major physiographic units that structure the country's natural landscape.

To this foundational layer, an additional dataset of selected grazing lands extending beyond Jordan's borders into Syria and Saudi Arabia has been integrated. The additional cartographic layer highlights the traditional grazing zones of Wadi Sirhan, adapted from **Patrick H. Morrish, "Camels, Pastoralists, and State-Making: The Banu Sakhr of Transjordan in the Early Twentieth Century" (MA Thesis, 2022).** It also includes the highlands of Suwayda, which, according to local accounts from Deir al-Kahf, served as a summer grazing area for nearby Bedouin communities.

LEGEND

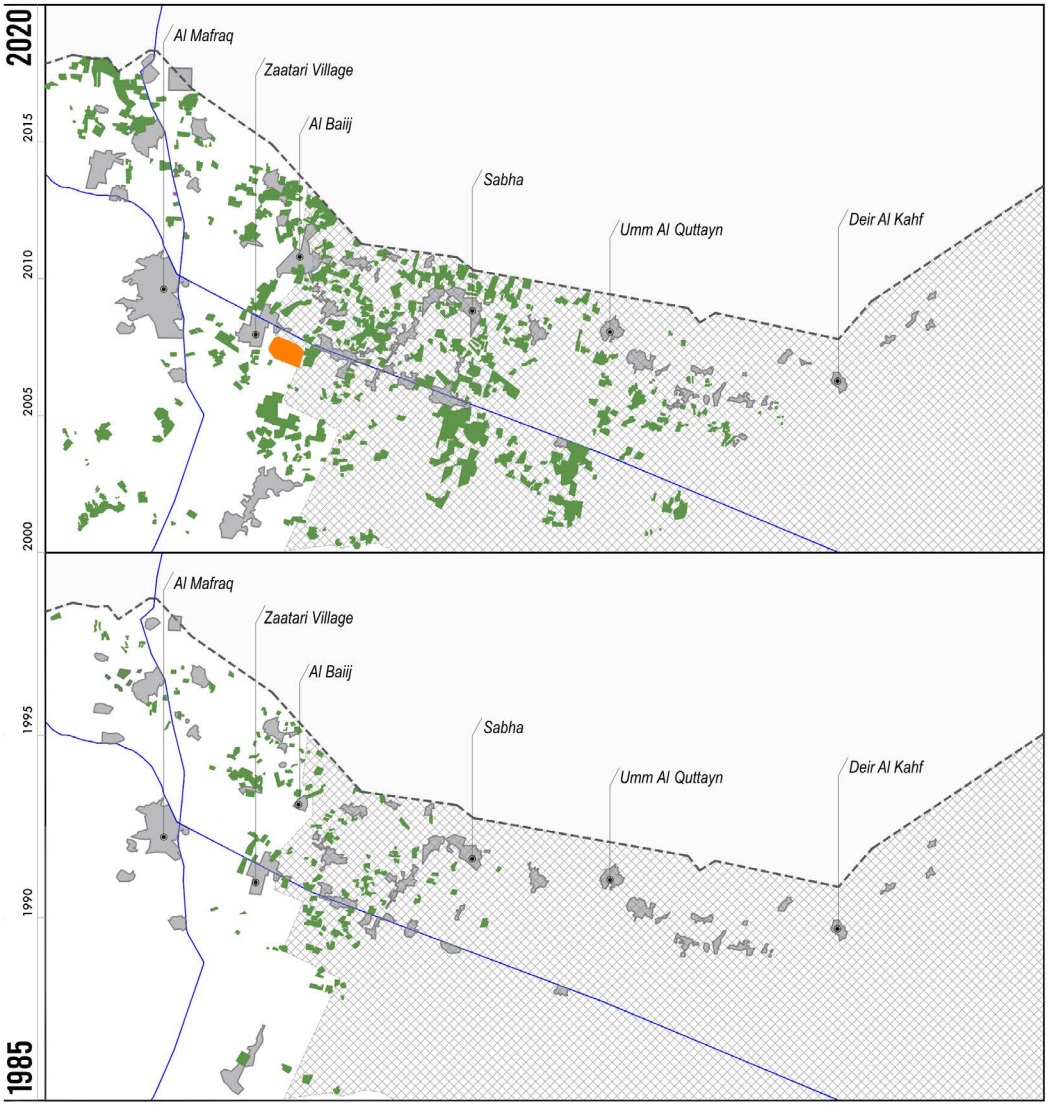
- Highland
- Jordan Valley
- Dry Steppe
- Semi Desert
- Desert
- Selected Grazing Lands

If borders confined the Bedouins within national boundaries, the growing efficiency of the state, both the Mandatory and independent state, further altered the Bedouin reality. The state expanded its bureaucracy, especially the army and security forces, which attracted Bedouin communities in particular. By the early 1990s, two-thirds of all jobs in Jordan were in the public sector, which absorbed 60 percent of educated labor market entrants. By then, sedentarization was nearly complete. In the 1920s, 50,000 people were estimated to be nomadic and 120,000 seminomadic, while during the 1990s most had been sedentarized. The army also expanded—from 8,000 soldiers after World War II, to 17,000 in 1953, 55,000 in 1967,[11] and over 100,000 by 1999—sustained first by British, and then by U.S. and Arab subsidies. This reshaped rural society. By 1970, as many as 70 percent of rural Jordanians benefited from the army, whose ranks increasingly included newly-settled Bedouins.[12]

These shifts profoundly altered Bedouin livelihoods. In the late 1990s, it was rare to find Bedouin families fully reliant on farming or herding. While many still kept sheep, acquired land, or practiced limited cultivation, state employment had become the main source of sustenance. With the modern state's expansion into the hinterland came planning and growth, as well as new market forces and external capital. These shifts created opportunities, such as access to groundwater and land ownership, as well as rural development projects. However, in Deir al-Kahf or other places, such as Azraq and the Northwestern Badia, the benefits were largely captured by outside investors, whose capital-intensive, unsustainable farming methods disregarded the environment or local communities.

The state's penetration of the steppe transformed land ownership and access to water. Beginning in the 1960s, the state granted licenses to access ground water, with little oversight. Demand for agricultural land in semi-arid regions (previously almost nonexistent) began to rise in the 1970s. Cheap water and land invited investment and the result was a mixed form of agriculture. On one end was "traditional" cultivation—low-intensity, modestly profitable, using rudimentary techniques, and often paired with livestock or local wage labor. On the other were modern, capital-intensive, groundwater irrigated orchard and vegetable farms, dominated by absentee landowners—emigrants or urban elites—who relied on foreign labor and targeted lucrative export markets. It was the latter model that prevailed, embodied by the East Ghor project of the 1980s and visible in the Azraq Basin, where some 90 percent of landowners reportedly lived in cities.[13]

In Deir al-Kahf, a similar pattern was evident. Locals gained access to land and water in the 1970s, yet most were unable to exploit this and sold their land for profit. Precise figures are lacking, but anecdotal evidence suggests that most investors came from outside the area, attracted by cheap land, water, and local labor.[14] Among the most prominent were Palestinians expelled from the Gulf in 1990–1991, who invested in agriculture.[15] Satellite imagery supports local accounts showing cultivated land spreading in Deir al-Kahf in the early 1990s.



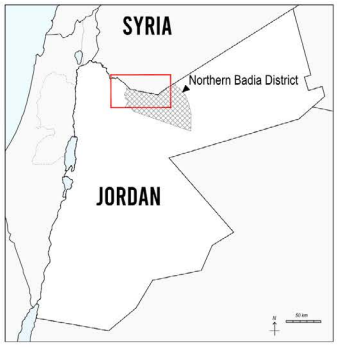
The Expansion of Groundwater Irrigated Cultivated Areas in Northern Badia

The expansion of irrigated cultivated areas by groundwater in northern Jordan was analyzed using Google Earth's historical imagery. For each year under study, a collage of approximately 30 screenshots was compiled to maximize spatial detail and account for variability in image clarity. Field boundaries were manually digitized from these collages to generate the map presented here.

Limitations: The methodology is subject to inherent constraints. Variations in image resolution and detail when zooming in and out may affect the precision of delineated field boundaries. Consequently, the map should be interpreted as a qualitative representation of temporal trends in land expansion, rather than as an exact measurement of cultivated areas. This approach enables a comparative visualization of land-use changes over time while acknowledging the limitations of satellite imagery for fine-scale mapping.

Disclaimer: This map is intended solely for illustrative and research purposes and should not be used for legal, cadastral, or decisionmaking purposes requiring precise land.

KEY MAP



LEGEND

- Syria Jordan Borders
- Main roads
- Northen Badia District
- Urban zones
- Irrigated Cultivated Areas
- Refugee camp

The main role of youths in this agrarian economy was to be day workers in the fields. But they were increasingly replaced by cheaper Syrian labor after the Syrian refugee crisis in 2012. For instance, many women from Deir al-Kahf who used to work in agriculture lost their jobs to Syrians. To compensate, every day around thirty vans, each carrying fifteen to twenty women, travel to Azraq, where the women work in textile workshops for barely 230 Jordanian dinars ($325) monthly.[16] The influx of Syrians was a golden opportunity for investors given that labor costs were reportedly very high in their overall business expenses, sometimes reaching 55 percent.

In terms of sustainability, there is good evidence suggesting that agrobusinesses contributed to environmental degradation, of which water is the best evidence. Nationally, groundwater use in 2019, or the abstraction level, was 618 million cubic meters (mcm), some 200 mcm above safe yield levels, with 59 percent going to domestic use and 36 percent to irrigation. In the Deir al-Kahf area, which is split between the Zarqa and Azraq groundwater basins, safe yields are 87.5 mcm for the Zarqa Basin and 24 mcm for the Azraq Basin, while the abstraction level in each is 165 mcm and 69.7 mcm, respectively. Accessing water is becoming more difficult by the year, while cultivated land has dried up due to the inaccessibility of ground water.[17]

With regard to livestock, there are some 28,000 sheep in the Deir al-Kahf subdistrict.[18] Most owners are from the Badia, but as one community leader explained, over the years ownership has been concentrated in the hands of some fifty individuals, marking a sharp departure from the past when ownership was more equally distributed.[19] The high costs of sheep maintenance have left small farmers at a disadvantage. Owning even a minor herd of a few dozen sheep is expensive and risky, with the costs tied to volatile markets.[20] A comparative study of sheep production systems from 2012 estimated that under the common transhumant system—where herds graze around a permanent base but migrate seasonally—maintaining fifty sheep costs about 26,000 Jordanian dinars ($36,000). Profitability requires capital, access to higher-paying markets such as Saudi Arabia, and resilience to disease and fodder price shocks. For most people in Deir al-Kahf such barriers are prohibitive, so many keep only a few sheep for household use.

All interlocutors from Deir al-Kahf voiced frustration with being unable to take advantage of available opportunities as their traditional economy eroded. Most troubling, however, was the decline in state employment and growing competition for jobs. Data support this trend. Public employment in Jordan dropped from 63 percent in 1992 to 32 percent in 2019 and rose slightly to 37.3 in 2024. The share of educated new entrants absorbed by the state fell from 60 percent in the 1980s to just 30 percent by the beginning of this century. Among young men (fifteen to twenty-four), unemployment rose from 25.4 percent in 2010 to 44.8 percent in 2024, peaking at 51 percent in 2022. For young women, it climbed from 54.8 percent to 60 percent during the same period, with a peak of 81.1 percent in 2022.

Public-sector hiring once prioritized geography through the Civil Service Bureau (CSB), giving residents of places such as Mafraq better opportunities due to the relatively limited competition for jobs. For lower-level public jobs that were once filled locally, authority was gradually centralized under the CSB and ministries, restricting local hiring autonomy. In 2022, the CSB was replaced by the Public Service and Administration Commission as part of public-sector reforms, shifting from geography-based recruitment to direct competition within ministries. This reduced opportunities for peripheral areas such as Deir al-Kahf and made applicants' skills and experience decisive.

Cheap land, access to water, and rising global demand for meat created an incentive for investors to pursue capital-intensive, high-profit agriculture. If early in the twentieth century Bedouins lost much of their animal wealth to drought and Ibn Saud's raids, by the end of it, they lost it to the industrialization of sheep farming and modern farming techniques. Most devastating, however, was the shift in employment. Since the Mandate period, militarized welfare had been the backbone of economic transformation and the safety valve shielding these communities from socioeconomic change. With public-sector reforms and a reduction in state employment, this valve has been partly closed.

The Growing Concern of Climate Change

Climate impact is both an old and new factor for the inhabitants of Deir al-Kahf, one that is now increasingly tangible and measurable. The drought that occurred during the mid-1920s was crucial in shaping Bedouin trajectories. In discussing climate change with focus groups from villages in Deir al-Kahf, the authors concluded it is still not a central concern for the inhabitants, in comparison to water depletion, overgrazing, and especially unemployment.[21] However, it is emerging as a key issue. Even optimistic forecasts suggest climate change will move from being a marginal factor to a central one among locals.

Rainfall and heat were the two factors most often linked to climate change in our focus groups. Rainfall's growing unpredictability was a common complaint. A cultivator from Mafraq, who grew rain-fed wheat, recalled more reliable rains during the 1980s.[22] Further east, in Deir al-Kahf, locals likewise described rainfall as more variable, pointing to vast areas of half-grown wheat.[23] However, qualitative and quantitative data on rainfall are not conclusive. Deir al-Kahf, where rainfall is between 50–100 mm annually, falls within an arid zone in which precipitation is typically erratic. A 2015 study of nine meteorological stations in the Badia confirmed highly fluctuating precipitation and a slight downtrend in rainfall compared to the 1970s: Safawi's rainfall fell from just over 150 mm in 1977 to under 100 mm in 2004, while Mafraq's declined from above 200 mm to about 160 mm for the same years. Yet the authors cautioned that "conclusions or quantifying the annual decreasing rate is not feasible due to the high fluctuation in the precipitation data."

Fields near the Syrian border that have withered before ripening, Near Ramtha, Irbid Governorate, Jordan

Dry fields some 30km from Mafraq city on the way to Deir al-Kahf, Northern Badia, Mafraq Governorate, Jordan

When looking at the Precipitation Concentration Index, which measures how evenly rainfall is distributed, a 2024 study across 164 stations in the Levant showed increasing rain concentration. This pattern was reflected in many parts of Jordan's arid and semi-arid zones, but the station closest to Deir al-Kahf was in a band where rain has been irregular since the 1970s.

Unlike rainfall, data on rising temperatures in the Badia is both conclusive and alarming. Historical studies indicate that minimum annual temperatures rose in the last decade of the twentieth century. A study that looks at Jordan's semi-arid and arid-areas in the north (from Mafraq to Riwaished) claimed that between 1980 and 2010 there was an average increase of 0.02–0.06°C per year. Projections for Jordan foresee an overall rise of temperature between 1.7 and 4.5°C by 2080 compared to pre-industrial levels, depending on climate scenario. Another study highlighted a growing number of hot days (above 35°C), with the Badia recording the highest counts nationwide. If those projections are remotely true, alongside current rates of water depletion, Deir al-Kahf and similar areas in Northern Badia will soon be unsuitable for cultivation or grazing.

The Social Impact: Coping Mechanisms and Policy Pathways

The main coping strategy reported during the focus group discussions with both older and younger generations was migration westward in search of work.[24] The city of Mafraq, some 80 kilometers to the west, has been a magnet for internal migration from Deir al-Kahf and elsewhere.[25] A town of 6,000 people in 1950s, Mafraq grew to 58,000 in 2009 and 150,000

in 2022. After 2011, the main reason for its growth was cross-border migration, with an influx of Syrian refugees. However, a 2024 report notes that rural-urban migration has also been a factor in the city's growth.

In terms of policy directions, the focus group discussions revealed three main lines of thinking pertaining to employment, the border economy, and environmental sustainability, offering fresh insights into the challenges Deir al-Kahf faces. Past policies have mainly been implemented through development work, capacity-building, nongovernmental organizations, and a reform of state regulations, for instance related to water use. However, after decades in which the benefits of development largely bypassed local communities as their socioeconomic situations deteriorated, it remains questionable who gains from more of the same.

In terms of state employment, open markets and merit-based competition for state jobs may sound appealing in theory. But for a community long dependent on secure state employment, they threaten the population's main source of livelihood. As one senior elected official put it, young men from Northern Badia cannot compete for positions with those from Amman and Irbid.[26] Therefore, some form of preferential treatment is necessary to level the playing field for residents of Deir al-Kahf and other marginalized communities in Northern Badia, whose access to education, capital, and basic services remains more limited than that of the inhabitants of major cities.

When it came to developing the local economy, the discussion was less about seeking more external aid or development projects and more about unlocking the potential of open borders. This was striking as the region's political geography, especially borders and border crossings, reflect realities from the Mandate era. The borders the Mandatory powers imposed, whether with Syria or Saudi Arabia, divided communities that had been part of broader, continuous socioeconomic ecosystems, which remain embedded in the inhabitants' mental geography. This has led them to think of alternative paths to revitalization, for example opening an official border crossing with Syria to reconnect local communities (the nearest crossing with Syria, Mafraq-Nassib, is 100 kilometers away), stimulate the local economy, and create an alternative route linking Syria and Saudi Arabia through Jordan in both directions. However, such thinking, as appealing and innovative as it might be, is unlikely to influence leaders in those countries.

A third policy pathway relates to sustainability. Research and focus group discussions reveal a prevailing pattern of agricultural development driven by outside investors who are focused on exports. They use land and water unsustainably, reflecting a short-term approach of exploiting resources intensively "while they last." Such a rationale is amplifying environmental degradation, compounded by the fact that these activities increasingly fail to benefit local communities and are further exacerbated by climate change. Participants agreed that stronger regulations and oversight, the creation and maintenance of protected natural areas, and the management of water wells by public entities rather than private actors, for the benefit of entire communities, represent the most viable paths forward.

Conclusion

There is a dark irony at play. A century ago, settlement was the coping mechanism of the hitherto migratory Bedouin. They were faced with the collapse of the Ottoman Empire, and with it the loss of privileges, alongside a prolonged drought, the drawing of national borders, and the advance of state authority into the hinterland. Today, over a century later, migration away from the steppes has been their sedentary descendants' coping strategy—the very steppes the Mandatory and post-Independence authorities sought to settle and cultivate.

Unfortunately, the odds are stacked against the local community. Jordan's broader macroeconomic outlook is not very promising, compounded by Deir al-Kahf's geographical isolation, the state's diminished capacity to employ the population, mounting environmental challenges, and the looming threat of climate change, among others. What could potentially alter this trajectory is not more of the same, but a new policy approach. One such shift could derive from rethinking colonial-era borders and imagining ways to reconnect the economy of Northern Badia with that of Syria and Saudi Arabia, as it once was historically.

03

Kuwait's Bidun in the Face of Climate Change are Invisible, yet Exposed

Courtney Freer

Introduction

Located in one of the world's hottest regions, with an economy that is reliant largely on the production of hydrocarbons, Kuwait presents a critical case study in the effects of climate change, particularly for specific sectors of the population. Though the country boasts a relatively high Gross Domestic Product per capita, wealth is not distributed equally. Furthermore, global warming and extreme weather disproportionately affect those people in areas marked by weak infrastructure and little government aid, with conditions likely to become even more severe in the future. The *bidun jinsiyya*, or those without citizenship, often referred to simply as the *bidun*, are arguably the most vulnerable. For this reason, mitigating the repercussions of climate change in Kuwait is not only necessary for its own sake, but also for lessening economic disparities and achieving some measure of social justice.

A Historically Neglected Community

The bidun population comprises tens if not hundreds of thousands of lifelong yet stateless residents of Kuwait. (This category of people is found across the oil-wealthy rentier states of the Gulf.) Bidun residents experience a form of internal displacement within a wealthy (and largely) urban landscape; they are administratively invisible yet materially exposed. Their situation underscores how legal marginalization and climate vulnerability intersect, producing a spatial precarity that is neither accidental nor temporary. It is a state of affairs that is structurally embedded in Kuwait's management of citizenship and welfare.

In Kuwait, to obtain "original" citizenship, people are required to trace their roots to the country as far back as 1920. Following independence in 1961, new legislation allowed for the naturalization of Kuwaitis who did not have documentary evidence of their families' having settled in Kuwait by 1920. At the time, this was approximately one-third of the resident

population, and consisted primarily of Kuwaitis of tribal origin whose families had not sedentarized by 1920. Nonetheless, to this day, there remains a large number of bidun, who are legally distinct from the country's population of foreign workers.

> **The bidun have been classified as illegal residents since 1986. This status renders them incapable of obtaining Kuwaiti citizenship.**

Unable to vote in parliamentary elections, legally prevented from forming nongovernmental organizations, and excluded from the handsome government benefits that Kuwaiti citizens enjoy, the bidun have been classified as illegal residents since 1986. This status renders them incapable of obtaining Kuwaiti citizenship, which complicates employment opportunities for members of the community. One interviewee complained that jobs for bidun are few and far between, and that, because salaries rarely rise above the bare minimum, it is difficult for one to afford to pay rent.[27] Others lamented their inability to buy property or even register vehicles due to their status.[28]

Between September 2024 and December 2025, the Kuwaiti government stripped some 50,000 Kuwaitis of their citizenship, arguing that they had obtained it illegally. In October 2025, the authorities overrode Article 8 of the Kuwaiti Nationality Law, which allowed non-Kuwaiti wives of Kuwaiti men to be naturalized, and applied it retroactively, thereby once again augmenting the numbers of bidun overnight. And in February 2026, the government passed an amended citizenship law. The details of the law have not yet been released, but the government's justification for such new legislation is telling. The new law "stems from the importance of regulating citizenship as a pillar of state sovereignty, and from a commitment to preserving Kuwait's national identity, strengthening national affiliation and maintaining Kuwait's legal sovereignty in all nationality matters." It seems likely that the state will use this law to, among other things, revoke certain people's Kuwaiti citizenship.

Earlier, the state had made some efforts to address the community's grievances. The Central System to Resolve Illegal Residents' Status was created in 2010 as a means of helping bidun to prove their familial roots in Kuwait or, alternatively, to obtain identity cards that would grant them access to education, healthcare, drivers' licenses, and employment opportunities. Results, however, have been mixed. Several interviewees for this article cited government programs through the Central System, which allow bidun to join the military or to attend university, as those most helpful to them.[29] Such programs represent the sole opportunity for many members of the community to secure reliable and gainful employment as well as obtain access, however limited, to the state's social welfare networks. Nevertheless, as one interviewee pointed out, "Major obstacles remain, such as documentation restrictions, limited access to higher education, and [an] inability to obtain essential civil certificates."[30]

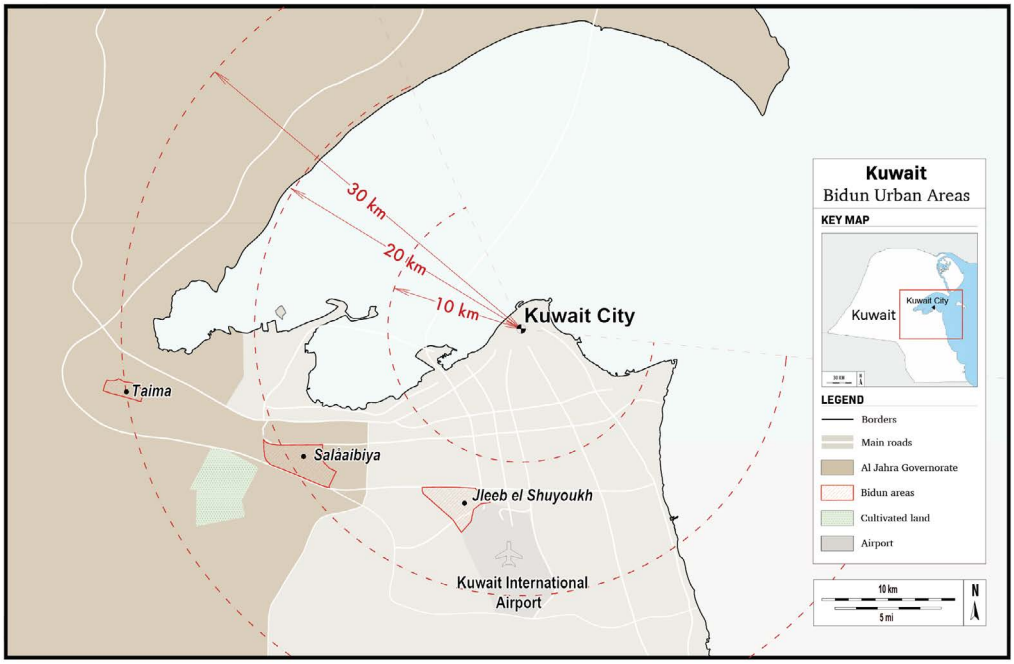
The living environment in Sulaibiya, where children play amid sub-standard housing. Source: Ali Fares

Because not all have registered with the Central System—many fear that doing so could subject them to increased government surveillance—the total number of bidun is unknown. Estimates range from 83,000 to 180,000 people in a country with a population estimated at just over 5.2 million (including foreign workers). Moreover, obtaining an identity card from the government through the Central System equates to formally renouncing any claim to citizenship. As Claire Beaugrand has pointed out, this "forces *bidūn* to accept un-belonging to acquire identification papers, without which they cannot interact with the rest of Kuwait's government bodies."

Though the bidun population is by no means homogeneous, the majority lives either in urban or suburban areas, specifically the Jleeb al-Shuyoukh slum of Kuwait City or Sulaibiya and Taima in the outlying Jahra governorate. All three of these districts suffer neglect at the hands of the state. Overcrowding and shoddy infrastructure are of especial concern. Additionally, informal or temporary dwellings and poor insulation exacerbate the effects of extreme heat, dust storms, and episodic heavy rainfall. All of this turns climate stress into everyday health and livelihood risks.

In Sulaibiya, residents have documented a clear lack of government support and investment. In December 2020, a bidun man attempted to take his life by self-immolation in protest of his poor living conditions; he had reportedly been unable to renew his identity card, which rendered him incapable of gaining employment. And in 2022, several bidun activists in Sulaibiya went on a nineteen-day hunger strike outside the neighborhood's police station. Over the course of May 2025, Jleeb al-Shuyoukh lost electricity due to alleged violations, such as people overburdening the network with direct power connections and changing

Figure 1. Map of Bidun Neighborhoods Outside Kuwait City



circuit breaker size without notifying government authorities. (The area was already suffering cutbacks because Kuwait as a whole is struggling with blackouts due to overstretched demand.) As for Taima, which lies even further outside Kuwait City (see map), it has faced security crackdowns owing to the construction of structures on state-owned land.

In 2025, Kuwait City Municipality announced new measures to better regulate housing and avoid overcrowding and fires in Jleeb al-Shuyoukh. These included the construction of foreign worker accommodations in industrial zones and on agricultural land, and the repair of damaged infrastructure in the area. Still, such projects will take between two and six years to complete. In the meantime, and perhaps even afterward, the living conditions of most bidun will continue to be shaped by chronic housing insecurity, degraded infrastructure, and heightened exposure to environmental stress.

The Bidun and the Ravages of Climate Change

The bidun live in a country grappling with an acute case of global warming as well as other forms of extreme weather. A 2022 Harvard study predicted a temperature increase in Kuwait of 5.54 degrees Celsius by the end of the twenty-first century. In a country where temperatures reached 50 degrees Celsius (122 degrees Fahrenheit) in 2025, leading the Ministry of Electricity, Water, and Renewable Energy to resort to rolling power cuts to help

handle the enormous demand on the system, this will likely increase heat-related deaths by 5.1 percent overall by the end of the century (among foreign workers, who were included in the count, the projected increase is 15.1 percent). Such heat also has a massive impact on ecosystems surrounding Kuwait, threatening fishing and agriculture and the people working in these realms. In addition to rising temperatures, Kuwait is likely to experience extreme weather in the form of droughts, dust storms, and flash floods.

Extreme weather and other climate issues disproportionately affect populations in areas with weak infrastructure and little government aid. So it is in Kuwait, with bidun neighborhoods more vulnerable than others. Interviewees consistently reported that rising heat in summer, regular power outages, and high cooling expenses adversely affected them. As one interviewee explained, "Older housing and limited economic means make extreme heat more difficult to manage."[31]

Insufficient or faulty drainage systems, the absence of sewage facilities, and the use of inferior construction materials have made homes vulnerable to rain and dust storms. Several interviewees reported experiencing water intrusion in their homes during rainstorms and a significant decline in housing quality over time. As one of them put it, "When it's rainy in Sulaibiyah, it's like the whole city is [affected]. The whole home will be damaged, also in the summer with dusty storms."[32] In certain instances, families relocate to makeshift shelters or arid regions during severe weather episodes.

Air conditioning is a huge burden on Kuwait's power consumption, with one 2020 study finding that some 67 percent of electricity used in Kuwaiti homes is linked to its use. The costs are heavily subsidized for Kuwaiti citizens but remain high for members of the bidun population. As a result, numerous bidun households decrease their air conditioning usage when they need it most. This raises health risks, especially for children, older adults, and those with chronic medical conditions. Furthermore, air conditioning is not available in some of the temporary housing structures where bidun live.

> **Given the instability and unsustainability of bidun living conditions, climate pressure deepens existing marginalization.**

There is also a psychological impact. Several interviewees reported stress associated with the cost of air conditioning in the long summer months, a lack of proper sleep when it is not used, and resulting physical and mental fatigue.[33] On a larger scale, many people described anxiety about the future as well as an inability to plan long-term life decisions related to education, employment, housing, and family stability.[34] Given the instability and unsustainability of bidun living conditions, climate pressure deepens existing marginalization.

Economic insecurity is closely related to climate pressures for members of the community. Many bidun are employed in informal or outdoor roles such as delivery, construction, and security at building sites. In times of severe heat, these occupations turn hazardous, resulting in shorter work hours, employment loss, or inconsistent earnings. This economic fragility restricts households' capacity to cope with climate challenges and perpetuates cycles of poverty. The Kuwaiti government does not seem to have recognized this fact; indeed, there is little targeted assistance for the bidun outside the Central System, which can provide identification cards but little else.

Given that government efforts to alleviate the effects of climate change have been limited, members of the bidun population have sought to use the informal *diwaniyya* system as a means of airing their grievances. The system in question involves weekly meetings in the private homes of community leaders. (Obtaining an audience directly with the authorities is nearly impossible; for example, only citizens are permitted to attend the various ministries' open house discussions, which were inaugurated following the ruling emir's dissolution of parliament in May 2024.) The hope is that those whom the bidun deputize to speak on their behalf may find a way to convey to government authorities, indirectly, the challenges the community faces. If state officials are unaware of the living conditions of the bidun, they will not be motivated to improve them.

Yet the government demolished the Sulaibiya *diwaniyya*s in the spring of 2025, claiming that they were built on public land and therefore illegal. The move signaled the state's awareness of bidun efforts to organize and its intention to curb the phenomenon. In light of all this, the modus operandi of most Kuwaiti bidun has been to devise methods to better endure their conditions, rather than attempt to change them in any sort of fundamental way.

As it happens, the state itself advocates precisely such an approach. The Central System's website, as translated by the author, counsels that "the focus should be on removing and addressing existing shortcomings so this segment [the bidun] can overcome its suffering instead of 'adapting' existing laws and proposing 'costly' amendments with their associated risks and unforeseen complications affecting security, social, cultural, and economic dimensions, and posing a threat to national identity in the present and future." Systemic change, then, does not appear to be part of the institution's mandate. One interviewee aptly described the situation of the bidun as a state of "permanent waiting."[35]

Charting a Future Course for Bidun and Kuwaiti Citizens Alike

In Kuwait, state-funded research has produced irrefutable evidence of climate change's impact. The government has acknowledged as much and stated that it "is committed to efforts that harmonize economic growth with a low-carbon, climate resilient development." Though this suggests that political elites view action as necessary, no climate-related legislation has been passed since 2023, and greenhouse gas emissions remain high. Research

has shown that "while the Government of Kuwait has committed the country toward moving to a 'low carbon equivalent emissions economy', there is an absence of discussion as to what this pledge means or how it should be implemented."

Political will, of the sort demonstrated by the government's periodic statements, is important in coming to terms with the challenges presented by climate change. Yet action—in the form of initiatives—is sorely needed. This is particularly true in the case of the bidun, given their marginalized status. Several initiatives would make for a good start. The sooner they are launched, the better.

Granting the bidun access to government services, particularly with regard to infrastructure, and doing so without discrimination, would aid the community in combating pressing issues related to climate change. The provision of identity cards similar to those issued to long-term residents or citizens would help to remove any stigma from this community. Throughout interviews, participants highlighted that statelessness (which is indicated in the paperwork carried by bidun, even for those who obtain identity cards through the Central System) increases vulnerability to climate stressors. Indeed, due to their lack of citizenship, the bidun are not only barred from government housing initiatives and electricity subsidies, but also emergency aid.

Tackling unsafe housing conditions would serve to protect the bidun. At present, building codes appear to be enforced primarily in affluent Kuwaiti neighborhoods. Ideally, they would be applied throughout the country. Additionally, services such as sewage and garbage collection should be provided uniformly and without prejudice. Such initiatives would go a long way toward ensuring that the most vulnerable sectors of the population are not left exposed to increasingly harsh elements. Taking into account Kuwait's hydrocarbon-generated wealth, this goal is achievable.

Additionally, there is a serious need for Kuwait to upgrade its electricity grid. In the longer term, it would be more sustainable for the state to raise awareness about the environmental costs of overuse of air conditioning or to tax households for such practices. Yet in the short to medium term, as high temperatures persist, the electricity grid must shoulder the burden. And this requires an overhaul of the system.

It was telling that, among the bidun interviewed, no mention was made of government efforts to temper the repercussions of climate change on their population, despite the extent to which global warming in particular impacts their daily lives. The Central System does not include any reference to mitigating its effects on the bidun. This is ironic, given that the body is supposed to help them deal with the challenges facing their community. It is essential to tie the Central System into state-wide efforts at combating the consequences of changing climate.

Ultimately, the need for all these initiatives must be communicated to the government in a way that aligns with its stated aims to address climate-related issues. By properly understanding and assessing the challenges at hand, including those facing the bidun population, the government can more effectively address them. Moreover, treating the bidun on an equal basis with Kuwaiti citizens would further social justice across the state. This would improve people's material conditions as well as enhance social cohesion.

Conclusion

In Kuwait, intense heat is already a serious climate-associated issue. It is also one that will grow more acute in the near future. Dealing with its effects is therefore quite urgent; there is little time for trial and error. Kuwait is fortunate in that it has the resources to address the matter. Officially, the government has signaled a willingness to do just that, but on the ground the relevant measures have been lacking. This is particularly true when it comes to the bidun, who receive the least government assistance despite the fact that they (and foreign workers) need it the most. Without a dedicated and concentrated campaign to overhaul infrastructure and services in bidun-populated areas, climate change will exact an ever-greater toll, both human and material.

04

Afro-Iraqis, Climate Change, and Environmental Injustice in Basra

Zeinab Shuker

Iraq is among the countries in the world most vulnerable to climate change. The conditions there are expected to worsen if underlying factors such as state capacity and infrastructure are not improved. However, this vulnerability does not affect all regions or all social groups equally. Groups occupying a lower position in the socioeconomic and political hierarchies, especially those living in the most climate-sensitive parts of the country, are more likely to experience the worst of the climate crisis. One such group is the Afro-Iraqi community in Basra Governorate—estimated at between 400,000 and 2 million people—which is especially exposed to deteriorating climate conditions and environmental degradation, a situation exacerbated by the group's vulnerable socioeconomic status.

Afro-Iraqis experience political, economic, and social marginalization and discrimination, which take several forms. These include a lack of access to resources, but also the use of derogatory terms to describe group members, which are the strongest indicators of disadvantage amid worsening environmental and climate conditions. Many community members suffer from high rates of poverty, illiteracy, and restricted social mobility. They are mainly engaged in manual labor or positions as entertainers, which decreases their economic and social status, as these roles are often looked down upon in Basra's conservative society. These economic conditions expose the poorest members of the group to the harsh realities of the region's climate disaster, which in recent years has led to significant increases in temperature and a decline in water quantity and quality. That is why the fate of the Afro-Iraqis is a good measurement of the suffering due to the extremes of climate change in Iraq.

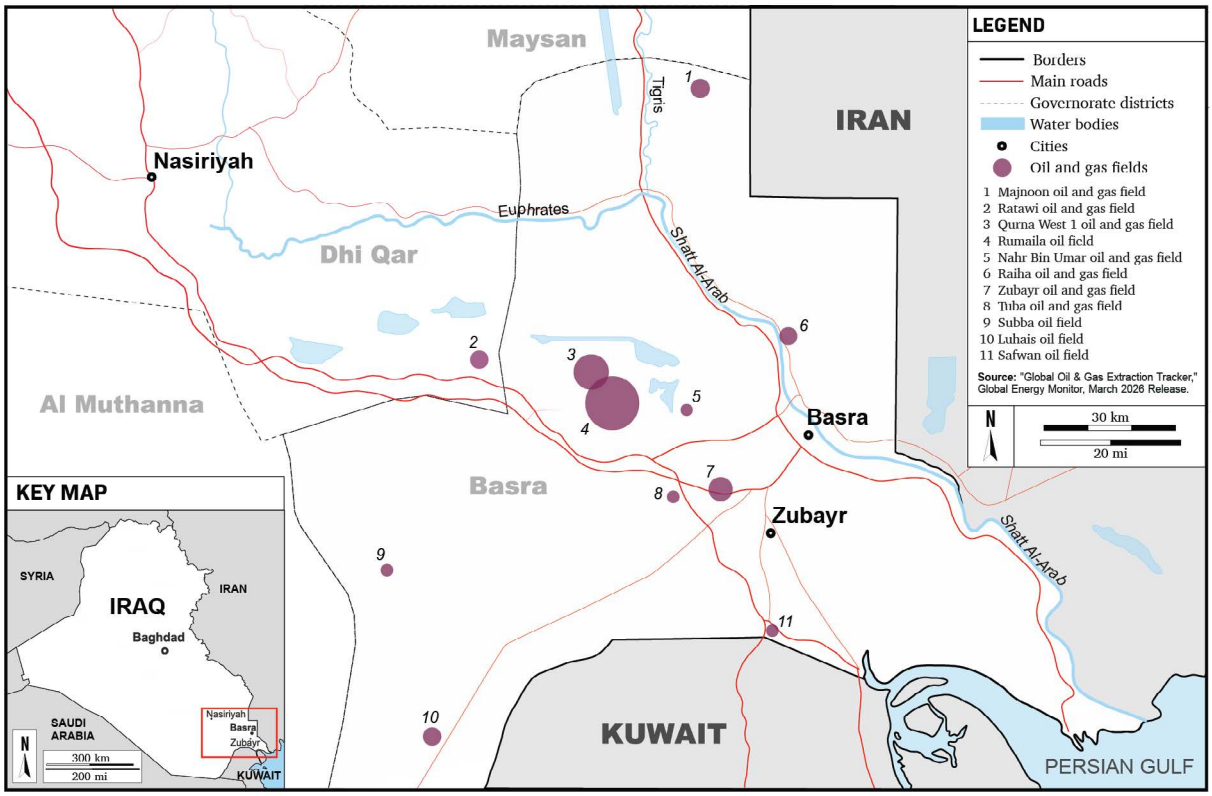
Iraq in Crisis and the Afro-Iraqis' Legacy

The precarious conditions of Afro-Iraqis are being aggravated by Iraq's climate crisis, especially in Basra, as well as by the community's social challenges, deriving from its history and invisibility. The presence of people of African descent in Iraq dates back to the Abbasid era around the beginning of the ninth century, when large numbers of people from East

Africa, especially from modern-day Kenya, Tanzania, Mozambique, Zanzibar, and Ethiopia, were enslaved and transported primarily to the city of Basra. They were forced into hard labor, such as draining salt marshes and mining salt, but also cultivating sugarcane and dates.

Racial prejudice became ingrained because of a labor market reliant on servitude, and later low-paying jobs. This was based on an ideological framework reinforcing the Afro-Iraqis' social inferiority and marginalization. The situation persisted until modern times. A key moment in the community's history was the Zanj Rebellion (869–883 CE), led by Ali ibn Mohammed, which was one of the most significant and longest slave revolts in history. Though ultimately suppressed, the revolt ended the large-scale use of enslaved labor in agriculture in southern Iraq. Under Ottoman rule, slavery remained legal until the early twentieth century. During the Arab and Ottoman empires, a distinct social stratification emerged among the slave populations, with so-called white slaves, such as the Mamelukes, able to reach senior military or administrative positions, while black slaves, referred to as *abeed*, were denied the option of advancement. Slavery was officially abolished in Iraq in 1924. Today, much of the Afro-Iraqi community resides in Zubayr, located some 28 kilometers from Basra. Others are scattered around Basra Governorate or in other southern governorates such as Amarah.

Orientation Map: Afro-Iraqi Communities in Basra and Surrounding Oil Fields



Afro-Iraqis have paid a heavy price as Iraq and the broader region's environment has come under severe transformational pressures. Since winter 2020, large portions of West Asia, encompassing the Fertile Crescent around the Euphrates and Tigris Rivers, have experienced extreme drought conditions, and 2025 marked the worst drought on record in Iraq since 1933. Water quality in the country has also been steadily declining in recent years, as temperatures have been soaring, and the Iraqi political system has failed to act with urgency to address worsening climate and environmental conditions.

Afro-Iraqis have paid a heavy price as Iraq and the broader region's environment has come under severe transformational pressures.

Increasing temperatures and decreasing precipitation have led to a decline in agricultural production, increased tension and conflict among groups over limited resources, and an impact on the quality of life of those affected. For instance, 92 percent of Iraq's agricultural land is threatened by desertification due to climate-related events. A 2023 study found that 60 percent of farmers reported cultivating less land due to extreme drought, and that same year Iraq reported a decline in the harvest of eight of its top ten crops. This is an outcome of the country's limited capacity to adapt to and mitigate the impact of climate change, poor infrastructure due to years of corruption, neglect, and conflict, which have increased the impact of climate-related events, and the suppression of civil society organizations involved in climate and environmental activism. These combined factors pushed the United Nations to label Iraq in 2022 as the fifth most vulnerable country to climate change.

Furthermore, given that many of the underlying conditions are systemic and political actors lack clear pathways to address poor institutional infrastructure, climate conditions will likely worsen. This leaves Iraq's most vulnerable groups exposed to harsh conditions and their consequences—health risks, displacement, conflict, loss of income, and more. For instance, the country is expected to be the hottest in the region by 2050, and the gap between water demand and availability is projected to widen from around 5 billion cubic meters today to 11 billion cubic meters by 2035.

Iraq's south, especially the city of Basra, is bearing the brunt of the climate crisis, despite significant oil resources. For instance, in 2018 water quality in Basra sharply declined, leading to waterborne diseases, the hospitalization of at least 118,000 people, and widespread protests against the local and federal government. The authorities responded with violence, quashing the protests. The water crisis in Basra is a long-term problem caused by several simultaneous factors, namely higher salinity, pollution, and infrastructure failure. For instance, reports indicate that untreated sewage flows directly into the Shatt al-Arab. Other key factors are declining water levels in the Tigris and Euphrates, before they merge into the Shatt al-Arab, along with poor infrastructure, unregulated water use, and reduced water flows from Türkiye and Iran. The marshlands in Nasiriyah and Amarah, which push water southward into the Shatt al-Arab and eventually the Persian Gulf, are also facing severe water shortages due to droughts and the drying up of wetlands caused by oil extraction

projects. This has led to a significant drop in water levels in the Shatt al-Arab and an increase in salinity to over 30,000 parts per million, roughly half the salinity of seawater. Because Iraq still relies on an outdated flood irrigation system, saline water has severely damaged much of the farmland around Basra, particularly in areas such as Zubayr.

> **The combination of rising temperatures, environmental degradation, and poor resource management is making cities such as Basra unlivable during the summer months.**

The loss of farmland and greenery has exacerbated the impact of high temperatures and pollution. Iraq has one of the highest carbon emissions per GDP rates in the region, mainly originating from the energy sector, including oil production and gas flaring. In fact, Iraq is responsible for the second highest percentage of gas flaring in the world after Russia. Consequently, cities and towns near oil refineries, such as Zubayr, suffer the worst impacts of oil- and gas-dependency and inadequate infrastructure. The combination of rising temperatures, environmental degradation, and poor resource management is making cities such as Basra unlivable during the summer months. Temperatures in Basra have frequently exceeded 53 degrees Celsius (127 degrees Fahrenheit), especially near oil fields. Groups with limited economic and political power are the ones most likely to live closer to such locations, due to the higher cost of living and competition for housing in Basra city, exposing them more to environmental and climate risks. The limited political power they enjoy curtails their ability and resources to advocate for solutions to their environmental challenges.

How Socioeconomic Marginalization Exacerbates Environmental Injustice

The legacy of slavery in Iraq, despite its abolition just over a century ago, can still be seen, especially in the invisibility of the Afro-Iraqi community in the national political and social discourse.[36] To understand the group's current marginalization and higher exposure to the risks of climate change and environmental degradation, we must understand its standing in the Iraqi political and economic system, especially after the U.S. invasion in 2003 and the downfall of Saddam Hussein.

With the Baath regime gone, Iraq entered a transition in which many components of the population received some form of political and social representation in the new order. The system created a hybrid form of rentierism, specifically the apportionment of quotas in the state to the country's ethnosectarian groups. This provided access to economic opportunity and resources, strengthening patronage networks, and providing these groups with protection, while continuing Iraq's dependency on oil production as a main source of income. However, Afro-Iraqis were not included in this carve-up, making them invisible in the political, economic, and social spheres. For example, in 2007, activist Jala Diab Thijeel founded the Free Iraqi Movement to advocate for Afro-Iraqi civil rights. The movement gained momentum after Barack Obama's election in 2008, inspiring Afro-Iraqis to seek political representation. However, this was met with violence and Diab's assassination in 2013.

This brutal response, among other factors, reinforced the idea that racial categorization was not welcomed in Iraq at the time, underlining that one's race was not a significant aspect of one's identity, history, and socioeconomic standing. Diab's killing pushed many members of the Afro-Iraqi community (and the majority of those interviewed in the focus group for this article) to minimize the role of racial identity in their lives, whether out of fear of retaliation or out of a genuine belief that such an identity was not a primary characteristic of their lives.[37] While members of the community tend to downplay their race in conversations, almost all of them, when pushed, justified such an attitude by saying that they didn't want to attract attention or trouble to themselves, while citing examples of racial discrimination.

Many members of the Afro-Iraqi community live in Zubayr alongside people not from their community. The town's main identifying feature is the residents' socioeconomic status. A majority of Zubayr's residents are lower-income individuals living in difficult conditions, characterized by limited infrastructure and resources.[38] The main road connecting Basra to Zubayr is paved, as are some of the town's key roads. This is a recent development, however, thanks to the initiative of Asaad Abdulamir al-Eidani, a politician and businessman who has been the governor of Basra since 2017.[39] However, all of Zubayr's side streets are unpaved, and many are inaccessible by car. When it rains, the side streets become muddy and very difficult for pedestrians, who have to use wooden planks and other means to avoid getting fully covered in mud.[40] That is why the inhabitants will point out that the winter or rainy season, not the hot summer months, are the most challenging for them, as even light rain renders streets impassable and keeps children from attending school or adults from working.

A side street after light rain in a Zubayr shantytown, Iraq.

An unpaved side street after a light rain in Zubayr, Iraq.

Not only are many streets unpaved, but for decades the sewer infrastructure was either outdated or nonexistent, leading to sewage entering homes and flooding streets during the rainy season.[41] Many residents pointed out that only in recent years has a new infrastructure been built, leading to a significant improvement in the quality of life. However, these improvements have not extended to the shantytowns around Zubayr. Certain neighborhoods are also close to oil refineries, and driving through them, one can smell flared gas filling the air, making breathing very difficult. Other residents who do not live near these refineries say that on windy days the smell of gas and burning oil products permeates the whole town.[42] Beyond the polluted air and inaccessible side streets, garbage dumps are present alongside residential areas, with children frequently playing in these dangerous landfills. Additionally, surplus garbage is frequently set on fire, and because these sites are located near homes, the smoke spreads throughout inhabited areas, especially on windy days.[43]

There are three main categories of people living in the shantytowns around Zubayr who are the most vulnerable to climate change and environmental degradation. First, there are the poorest of the poor who do not have access to long-term housing or employment. This category includes not only members of the Afro-Iraqi community, but also those from the lowest socioeconomic classes in the city in general.[44] Second, there are Afro-Iraqis whose parents are not Iraqi and therefore lack official documentation.[45] Because of their ambiguous legal status, it is difficult for them to find employment, which affects their living conditions. In one case, three sisters born in Iraq, but whose father is Sudanese, found themselves in this situation and were forced to live in a house made of zinc-coated metal sheets, enduring

Oil refiners close to residential areas in Zubayr, Iraq.

An Afro-Iraqi child in a Zubayr shantytown, Iraq.

extremely hot conditions in summer and very cold ones in winter.[46] The sisters indicated that while the rainy season was difficult, the extreme summer heat was the most challenging, making breathing very difficult.[47]

The final category is made up of internally displaced families who come mostly from Nasiriyah, some 200 kilometers away. They are generally not Afro-Iraqis, and these families migrated because of tribal conflicts or environmental factors. Among the displaced are many people who worked in agriculture, therefore have suffered from the impact of drought, losing both land and a source of income. The climate-induced displacement of these families has had a negative impact on those living near the shantytowns. During interviews, this group of displaced families was often accused of provoking conflict and altering Zubayr's social fabric.[48] These claims were echoed by political actors in Basra and elsewhere, emphasizing the tensions and divisions between rural and urban communities in Iraq, as well as the unequal distribution of resources among them.[49] This demonstrated that while the Afro-Iraqi community has not experienced climate-related displacement as have other communities in the area, climate-induced displacement still negatively affects the group's social cohesion and stability in indirect ways. Many members interviewed also remarked that part of the tension resulted from increased competition over limited job opportunities in the area.[50]

A side street covered with garbage in a Zubayr shantytown, Iraq.

These observations highlight several key points. First, racial identity is important in determining social and economic outcomes. As the population grows across Iraq, public-sector employment is becoming scarce, and private-sector employment is emerging as an important tool for economic mobility. However, members of the Afro-Iraqi community continue to struggle to access employment in the private sector due to preexisting racial hierarchies, which means that they are more likely to be left to compete over the limited openings in the public sector, or to work in sectors they have historically occupied, such as music, dance, or construction, all of which offer limited revenues.[51] Construction, in particular, has become more dangerous and inadequate amid rising temperatures in the area, affecting the living standards of Afro-Iraqis in a highly deleterious way.

> **Climate change is a threat multiplier for Afro-Iraqis, adding to the discrimination they already face as a consequence of their socioeconomic status and racial identity.**

The relentlessness of the heat came up time and again in conversations with members of Afro-Iraqi focus groups. One of them, a police officer, recounted how extremely high temperatures frequently forced him to seek shelter, or at times skip work altogether.[52] Others in the same group pointed to counterparts who worked in construction, emphasizing that they were more likely to lose income and opportunities because of increasingly onerous working conditions.[53] Climate change is a threat multiplier for Afro-Iraqis, adding to the discrimination they already face as a consequence of their socioeconomic status and racial identity. It is also important to highlight that not only does the group's racial identity contribute to their marginalization, but so too does their sectarian identity. In an interview with one member, he emphasized that many group members belong to Sunni tribes in a part of the country controlled by Shia-dominated tribes.[54] This identity further restricts their patronage networks, therefore their access to power, resources, good employment opportunities, and housing, which consequently reduces their climate resilience.

Second, while there have been significant improvements in recent years in many parts of Zubayr—from continuous electricity supply for most of the town's residents to a new sewer network to some paved roads—the overall climate crisis remains unchanged and perhaps has even worsened. For instance, along the Shatt al-Arab in Basra there used to be numerous palm groves and agricultural fields that played an important role in regulating temperatures in the area. However, as saltwater levels rose and the government failed to intervene at critical moments to ameliorate the situation, many farmers sold their farms to businessmen, who redeveloped them for housing and commercial use.[55] What had been the city's lungs was turned into a concrete jungle, contributing to higher temperatures. While improved infrastructure can ease the burden of the scorching summer heat, those with limited resources, including residents of shantytowns, are forced to fend for themselves.

Picture taken at night from the Italian Bridge, demonstrating the disappearance of green space and the urbanization of al-Tannumah area on the right side of Shatt al-Arab in Basra, Iraq.

As a result, the Afro-Iraqi community is squarely facing the effects of ongoing socioeconomic discrimination, worsening climate conditions, and a limited government response. Most importantly, the community lacks political and social representation to effectively advocate for its needs.[56] Therefore, to boost climate resilience among Afro-Iraqis, a comprehensive approach must be adopted that addresses not only climate and environmental crises in their neighborhoods but also considers issues such as racial and class marginalization. Frameworks such as the environmental justice approach are especially helpful in this regard. The environmental justice approach emphasizes that the benefits and burdens of climate change must be shared equally, with a focus on protecting low-income and minority communities, repairing past harms, and addressing the disproportionate, long-term environmental impacts experienced by marginalized groups.

Inclusive climate adaptation strategies also involve reckoning with existing social and economic inequalities affecting marginalized community members, since climate change at its core exacerbates threats and interacts with, and increases the harm of, economic and racial injustice and marginalization. This can include steps such as ensuring equal employment opportunities for community members in private-sector jobs, which can break cycles of poverty; implementing legislation that punishes the use of derogatory terms in school and work settings; providing financial support for residents of shantytowns and taking better steps to integrate them into local communities; revisiting the legal status of Afro-Iraqis who have no legal documents; and offering payment for past damages due to racial and environmental harm the group has endured for decades. In other words, class and racial justice cannot be separated from environmental justice.

Conclusion

The case of the Afro-Iraqi community in Basra illustrates how climate change does not occur in a social vacuum. Rather, it interacts with and intensifies preexisting inequalities rooted in history, race, class, and political exclusion. While Iraq faces mounting environmental pressures, the burdens of these changes are distributed unevenly. Communities such as the Afro-Iraqis, who already occupy marginalized positions within Iraq's socioeconomic and political orders, are disproportionately exposed to environmental hazards and possess fewer resources to adapt to them. Addressing these vulnerabilities, therefore, requires more than technical solutions to environmental degradation. Policies aimed at improving water management, infrastructure, and climate adaptation must also be accompanied by steps to reduce social and political inequalities that shape exposure to climate risks. Without such an approach, climate policy in Iraq, when and if introduced, risks reproducing the same patterns of exclusion that have long shaped the lives of marginalized communities.

05

Climate Pressures in Algeria: The Crisis in Rural Kabylie

Ilyssa Yahmi

Introduction

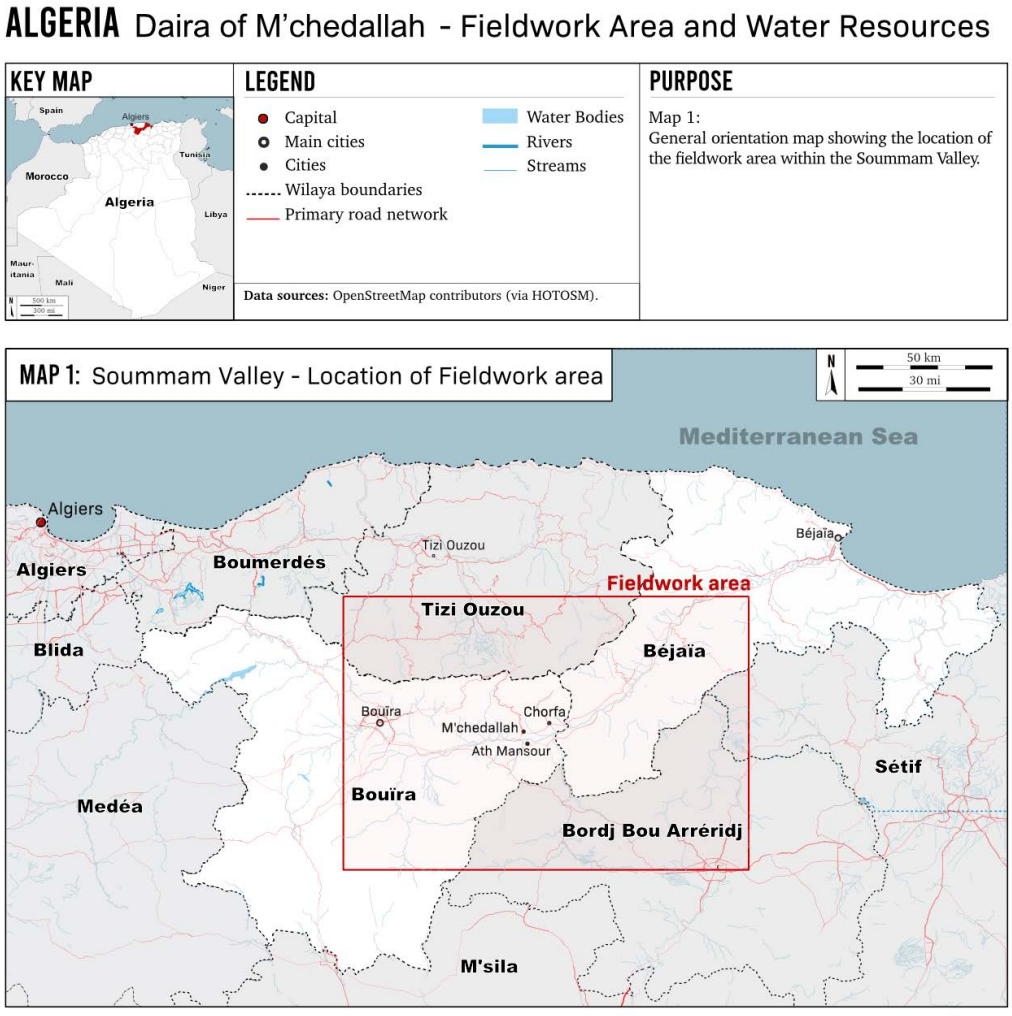
In Algeria, where the agricultural sector employs a significant share of the workforce, climate pressures are increasingly causing wildfires, disrupting irrigation, and making it difficult for farmers to sustain their livelihoods. The country's agricultural plan, announced in 2026, aims to double yields and expand export capacity through mechanization. Yet this does little to address the structural fragility of smallholder farming in Kabylie, a largely mountainous region in the north of the country. The human dimension of the climate crisis is as significant as the environmental one. Rural agrarian life in Kabylie is increasingly losing its traditional meaning—having become, for many, a set of ancestral practices detached from everyday reality.

Crops near the Assemadh river, February 2026

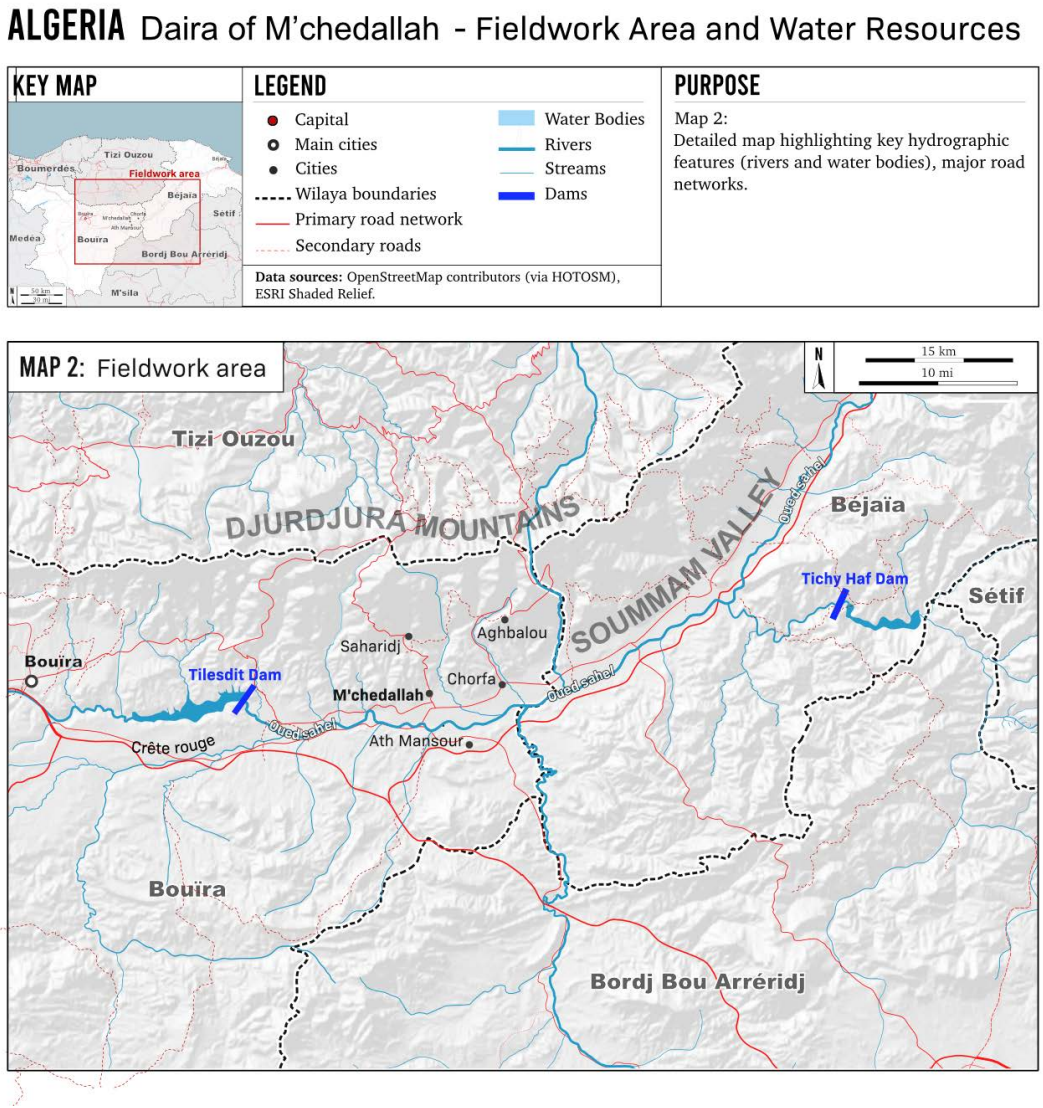
Kabyle Agriculture in a Time of Crisis

In Algeria, 24 percent of the national workforce and 74 percent of the rural workforce is employed in agriculture, with the region of Kabylie, which includes seven provinces, characterized by high rural population densities and an agrarian society. Kabylie is home to the fertile Oued Sahel-Soummam Valley, which runs along the Oued Sahel river from the semi-arid highlands of Bouira province and down through the narrow alluvial plain of the lower Soummam toward the Mediterranean coast in Béjaïa province.[57] The agricultural landscape of the valley in question has long been organized around small landowners cultivating olives and other tree crops (pears, cherries, figs) on fragmented plots.

Two broad categories of farmers coexist in this landscape, each with a distinct relationship to land, capital, and risk. The first is a declining population of self-sufficient peasant farmers, mostly operating in mountain areas. This group encompasses families and communities who have farmed their own land at subsistence level for generations. Self-sufficient peasant farmers are a population in long-term demographic decline whose lives are increasingly shaped by scarce and unreliable access to water, fragile ecosystems, and exposure to climate shocks.



The second category is a growing class of business-oriented agricultural entrepreneurs whose activities are concentrated in the valley floor but expanding to the plains of the lower Soummam and beyond (including the high plateaus outside Kabylie, particularly in the M'sila region). This group has greater access to capital, irrigation infrastructure, and market networks. Increasingly, it includes not only local farmers but also investors from regions outside Kabylie, who are putting money into the harvesting of land that locals focused on upward social mobility are quietly stepping away from.[58] Indeed, young Kabyle people, several of whom were interviewed for this article, are mostly oriented toward non-agricultural careers. They are a generation caught between two impulses: wanting to see Kabylie change and modernize, yet deeply unsettled by what that change is doing to their parents and their landscape. For many, this tension results in migration to other parts of Algeria or even emigration.



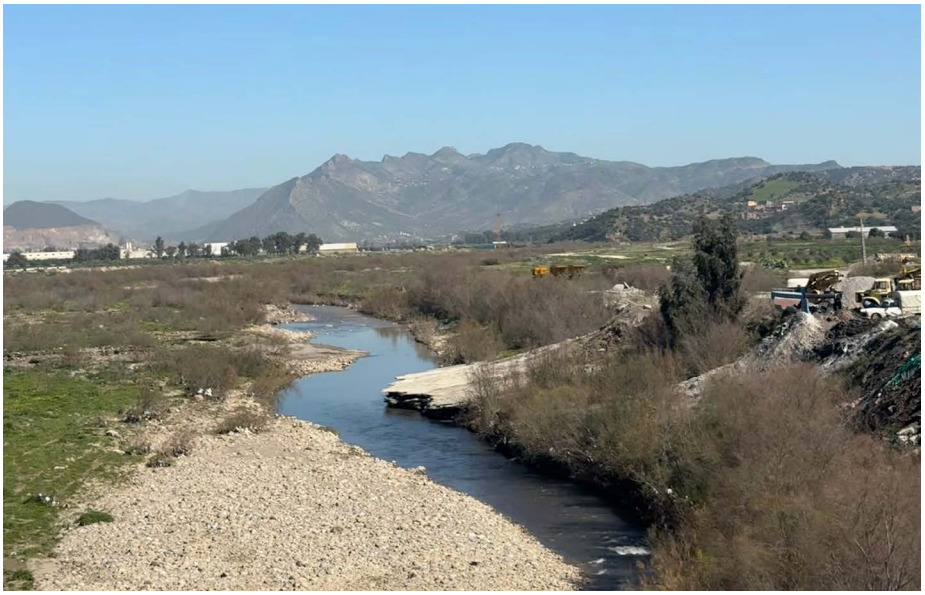
Climate pressures may not fall evenly across the two categories of farmers, yet they are accelerating the abandonment of traditional farming and narrowing the conditions under which both groups can sustain their livelihoods. Increasing water scarcity and soil erosion are reshaping the basic conditions of agricultural life and having a direct impact on olive cultivation, arboriculture, and cereal growing. Wildfires—which are most commonly caused by stubble burning, slash-and-burn practices, preventive burning, arson, wild honey harvesting, and the burning of illegal dumps, as well as flare-ups caused in part by the inability of firefighters to reach remote and rugged terrain in time—have become a recurring seasonal threat since 2007.

Beyond environmental stress, the pressures on this landscape are structural and long predate recent climate disruptions. In the lower Soummam Valley, between 1987 and 2019, forest cover decreased by 63 percent, agricultural land expanded by 30 percent, and built-up areas grew by 58 percent.[59] Traditional agricultural practices such as plowing with oxen are at risk of disappearing, kept alive only by a minority of farmers for whom they represent not merely a profitable activity but a heritage at risk of being lost entirely. This decline is driven not only by economic or generational uninterest but by the rising cost of oxen and pasture,[60] which has also contributed to a broader shift in livestock from beef to poultry. As rainfall becomes more scarce and less predictable, rain-fed olive cultivation, long the backbone of many locals' livelihoods, is also increasingly unviable.

Local communities broadly recognize that the climate around them is changing. Yet the options available to them are constrained by the institutional and economic conditions in which they find themselves. The idea of a future without mountain agriculture in Kabylie, one in which farming survives as a pastime rather than a livelihood, is spreading. Ultimately, this reflects a growing unease about the long-term viability of arboricultural traditions in the region.

The Paradox of Adaptation

Oued Sahel-Soummam Valley farmers' adaptation to climate change is lagging in several respects. This is the result of a combination of factors. The first are economic constraints: Small-scale traditional farming no longer generates enough income to meet the aspirations or even the basic needs of rural households. The second factor includes institutional incentives that both promote large-scale production and unintentionally reward other behaviors, such as irregular migration. And the third factor is a widespread belief that climate disruption is temporary. For all their differences, the adaptive responses to climate change by both the peasant farmers and the entrepreneurs are mainly defined by institutional and market pressures rather than climate awareness, and consequently often exacerbate negative results. Moreover, these forms of adaptation are gradually restructuring social identities, intergenerational relationships, and community life.



Oued Sahel in February 2026

Arguably the main problem is that the institutional adaptive measures that have taken hold are driven less by environmental logic than by administrative and economic incentives. Subsidy structures and drilling rights that reward mechanization, scale, and intensity have pushed farmers toward mass production models that are poorly suited to an environment that is increasingly water-scarce. The result is a central contradiction: Intensive agricultural practices accelerate the depletion of the very resources on which farming depends, contributing to the climate conditions that worsen agricultural viability. Adaptation and degradation feed each other in a cycle that policy has yet to interrupt.

The Social Costs of Economic Adaptation Strategies

Efforts made by individual farmers, investors, and state actors to sustain agricultural production are themselves eroding the rural way of life they are meant to preserve. Subsidy-oriented policies, designed to modernize and expand the sector, have had the unintended effect of making farmer registration a desirable administrative status, sought as much for the benefits it unlocks as for any commitment to agricultural activity. Diaspora remittances and foreign investment, while injecting capital into the sector, accelerate the shift toward large-scale entrepreneurial farming and further constrain the viability of smallholder livelihoods. Farmers are increasingly responding to local labor shortages by hiring the most precarious workers, while others respond to deteriorating conditions by expanding geographically. Meanwhile, the shift from rainfall-reliant irrigation to man-made infrastructure has exacerbated water scarcity.

The Algerian government offers registered farmers a range of support such as land concessions, seeds, beehives and bees, equipment, and subsidies covering inputs, production costs, and livestock feed. This makes formal agricultural status, obtained through registration, financially attractive well beyond its agronomic value. It also aligns with Algeria's broader agricultural self-sufficiency agenda, which is accelerated by public discontent over the rising cost of imported goods. Yet the policy contains its own contradictions: Livestock feed and vaccines remain largely imported, and the seeds distributed are hybrid varieties, which limits farmers' autonomy and locks them into dependency on external supply chains.

For some, agriculture has become less a livelihood than a legal and administrative gateway to emigration. Farmer status is strategically mobilized to access migration channels toward Europe. Migrants using this route begin by soliciting invitations enabling them to attend agriculture-related events in France, for which they subsequently obtain a short-term visa, which they then overstay. This practice is a new variation on what is locally associated with the phenomenon of *harraga*, a term used in Algeria to describe irregular migrants who attempt clandestine crossings, often by sea toward Europe. Yet this instrumentalization of agricultural status through legitimately obtained farmers' licenses reveals a broader pattern in which formal institutions are leveraged for informal ends, highlighting systemic failures that extend well beyond the agricultural sector. Inspections of land and crops undertaken to assess a farmer's status are strict and relate to the size of one's crop or the quantity of livestock and beehives—which explains why peasant farmers cannot easily obtain the license.

A related dynamic involves the flow of diaspora capital into the agricultural sector in Kabylie. Business-oriented farmers increasingly benefit from remittances and direct investment from Kabyle communities abroad, which channel money into land, equipment, and agricultural ventures in the region. This influx of external capital, along with the return to Algeria of ambitious entrepreneurs, accelerates the shift toward large-scale farming models and further marginalizes smallholder peasant farmers who lack access to equivalent resources. It also reshapes the social meaning of agricultural investment: Land becomes less a site of subsistence and identity than a vehicle for capital deployment.

Larger agricultural concessions have responded to resulting local labor shortages by turning to migrant and seasonal workers, including elderly men who remain in agricultural employment out of necessity rather than choice. This segmentation of the labor market concentrates the most precarious work among the most vulnerable components of the populations, raising serious questions about the long-term sustainability of labor supply in the sector. Some farmers also respond to deteriorating local conditions not by leaving agriculture but by expanding geographically and acquiring property in areas where land is cheaper, labor more available, and climate conditions more favorable. This form of

climate-driven territorial mobility does not register in conventional migration statistics, yet it represents a significant restructuring of how and where Kabyle agricultural capital is deployed. Access to water and electricity remains an administrative and logistical constraint in these new locations, suggesting that expansion relocates rather than resolves the underlying problem.

Indeed, the case of water is instructive. The past decade has seen riverbeds dry out from late spring through late autumn, prompting a shift from traditional gravity-fed irrigation through a network of small earthen trenches directing water across crops—a system called *terga* in Kabylie —to aspersion irrigation made possible by drilling. This shift is not only a technical change; it marks the abandonment of a collective, low-tech water culture that was adapted to the landscape over generations, and will deepen disparities between those with access to water infrastructure and those without. And, if anything, the regional dam near the Assemadh river, which was built for purposes of water storage, has not only failed to resolve the scarcity it was meant to address, but has worsened the effects of climate change; its basin shape and high summer temperature have resulted in evaporation that has raised humidity levels in the whole valley.

When it comes to peasant farmers' various strategies for coping with climate change, it is striking how little actually changes at the level of agricultural practice itself. Among peasants, the older ones continue dressing for cold winters that are shortened or no longer arrive, and prayers for rain remain a common cultural response to drought. Regardless of ecological shifts, including changes in local insect populations and the quiet disappearance of species such as the ladybug, peasant farmers do not alter what they grow or what they eat. Rather, they find ways to continue age-old practices despite deteriorating conditions. True adaptation would imply a deeper transformation: a change in crop selection based on more systematic weather predictions, and in the relationship between what the land can sustain and what communities consume. Instead, the effort goes into preserving a familiar model under unfamiliar climatic conditions while suburbanizing the lifestyle. This form of resilience, however understandable, accelerates the very degradation it is trying to outrun, an idea that many in the region have already internalized and accepted, but one that will deepen the precarity and vulnerability of the most exposed communities within an already fragile landscape.

Implications for Governance

Climate change alone does not drive agricultural transformation in the Oued Sahel-Soummam Valley. The forces of industrialization and the pursuit of economic profitability operate alongside, and often independently of, climate pressure. And several innovations sustain production in the short term while marginalizing the peasant farmers who cannot access them, all while quietly severing the relationship between agriculture and the traditional practices that gave it meaning. As a result of all this, policies that treat adaptation as a purely environmental challenge will miss the economic and institutional drivers that shape farmer behavior at least as much as the climate does.

Tilesdit Dam

Drilling irrigation infrastructure on a private orchard, illustrating the shift away from rainfall-reliance and terga

Terga system

Pastoral practices at the edge of expanding cities

The paradoxical dynamics at play in the Oued Sahel-Soummam Valley—adaptation that deepens vulnerability, migration that hollows out communities, institutions that promote unsustainable practices and reward mass production—point to four interconnected areas where more effective policies are needed. The first is local governance, which is structurally operational but inconsistent in enforcement. The second is water governance, where incentives currently favor scale and drilling over sustainability, concentrating the benefits of infrastructure among larger operators while leaving smallholders and communities to manage scarcity with improvised means. The third is land governance, where property rights and concession arrangements remain a source of tension and uncertainty. The fourth is ecological resilience, where fire-affected landscapes are recovering independently of, and even despite, current policy efforts.

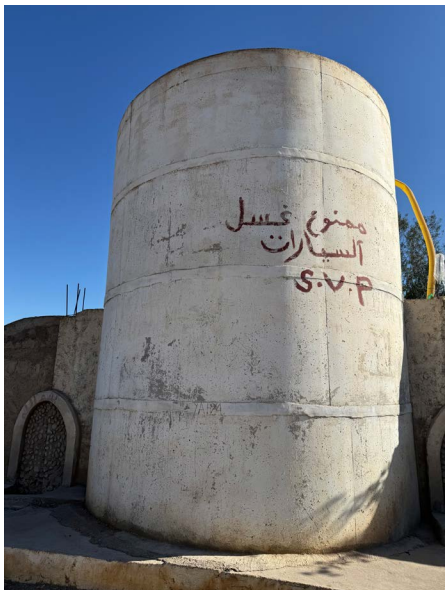
When it comes to the agricultural sector in Kabylie, the state is present at the local level—but this presence is uneven. For example, the M'chedallah subdivision in Bouira processes administrative requests more quickly than those in Bejaia, despite the two governorates being barely 15 kilometers apart. Although the subdivisions are mandated to inspect crops, cold storage facilities, and shops on a daily basis, enforcement is inconsistent. Consider, for instance, the situation when it comes to food safety and livestock: Despite formal controls, meat is still left exposed outside butcher shops, and the slaughter of animals in households (instead of registered abattoirs) remains common. Strengthening the enforcement role of the local subdivisions of the Chamber of Agriculture would gradually replace subsistence practices and ultimately improve crop and food safety, health standards, and regulatory compliance—all while enhancing state authority at the local level and better aligning practices with centralized and large-scale agendas.

Free-range poultry in a traditional smallholder setting

Industrial poultry cages in a large-scale farming facility

In the realm of water management, current incentives reward scale and drilling over sustainability. The large-scale model has reduced vulnerability for some farmers, but its costs fall disproportionately on smallholders. Communities with wells and drilling systems have installed shared taps where locals (not only the farmers among them) refill jerrycans with free potable water, helping to ease widespread scarcity and adapt to climate pressures. Water scarcity increases the appeal of subsidized projects, especially as hydraulic management systems require modernization. The answer lies not in making drilling permits more competitive, but in smarter distribution and hydraulic systems that use Algeria's coastline to bring water to areas with rainfall deficits. More reliable and frequent distribution would also reduce the hoarding and overconsumption inevitably caused by intermittent access.

As for land management, tension persists between individuals seeking full ownership and discretionary use of land on the one hand, and the state's model of granting long-term, inheritable concessions tied to approved projects on the other. This model of tying concessions to active cultivation and minimum output targets favors large-scale entrepreneurs, who are best positioned to meet the conditions. Addressing the matter requires action on both sides: simplifying pathways to ownership for subsistence farmers and those who have worked the land for generations, while also shortening concessions and tying their renewal to meaningful land use requirements rather than output alone. Together, such reforms would discourage speculative registration, create space for peasant farmers to embrace entrepreneurial activity, and boost local employment, all while guaranteeing long-term sustainability.



A privately owned water tank with free public access. The inscription reads "no car-washing, please," a sign of the informal rules owners impose to protect scarce shared resources

As for ecological resilience, the conditions for a low-cost, community-led approach already exist. In fire-affected landscapes, trees and crops regrow from ash-enriched soil. Fire acts as an accidental fertilizer that accelerates recovery without active intervention, a natural regeneration that favors reforestation and supports community-based land stewardship. This regeneration, if taken advantage of by Algiers, can create opportunities for local communities to assume an active role in managing and protecting land. For example, instead of allocating a generous stipend to unemployed graduates (something that may inadvertently disincentivize them from searching for work), the state could invest in rural youth employment.

In the larger picture, policies must address the instrumental misuse by certain people of their farmer status for emigration—a symptom of shortcomings in youth employment and migration systems rather than in agriculture itself. A starting point would be linking farmer registration to specific engagement requirements. This way, the status of "farmer" would reflect genuine agricultural activity rather than serving as a migration pathway. And, in the long run, it would serve to help reengage younger generations with their ancestral patrimony by encouraging an identity that is bound to the cultivation of the land.

Conclusion

If the dynamics of capital and emigration at play in the Oued Sahel-Soummam Valley are not arrested or at least attenuated, they will continue to reshape the region. Even among locals who have not left for better opportunities elsewhere, a quiet gravitation from rural and remote lifestyles toward suburban economic models is already underway. The traditional Kabyle living arrangement, in which several family members reside in an ancestral house shared across generations, is giving way to the phenomenon of apartment-dwelling. This itself signifies a displacement-of-sorts. Financial survival is becoming increasingly decoupled from agricultural productivity, and households are adopting diversified income strategies that treat farming as one element among many, rather than as a primary occupation. Ultimately, as the environment shifts around the people of the Oued Sahel-Soummam Valley, so too is the meaning of home itself.

06

Women, Water, and Adaptation in Ait Khabbash

Yasmine Zarhloule and Ella Williams

Climate change is not only altering environments but also reshaping the patterns of everyday life. Among the Ait Khabbash communities in the Draa-Tafilalet oases of southeastern Morocco, women are at the heart of this transformation. As rising temperatures and irregular rainfall exacerbate water scarcity, women have had to deal with both the visible and invisible consequences of ecological change—from longer journeys to find water to the erosion of social worlds once sustained by nomadic traditions.

In Draa-Tafilalet, climate change is visible in multiple ways: multiyear droughts, erratic downpours, and drying aquifers. Oasis agriculture is particularly threatened, with date palms yielding less, even as they are more vulnerable to disease. The traditional infrastructures that had sustained communities, such as the *khettara* system, a communal network of underground canals that channels groundwater to fields, which was once the backbone of irrigation and social life, are decaying as motorized pumps deplete water tables. In 2017, Zagora's "thirst protests" made this precarity visible. Residents took to the streets demanding their right to drinking water, prompting reforms in water distribution and investments in infrastructure from the state. As national policies lean on implementing big supply fixes, through desalination projects, dams, and inter-basin transfers, alongside governance reforms such as banning water-intensive crops, everyday life is being significantly altered in the oases and in local economies built around water scarcity—pressures that land hardest on women.

For generations, the women of Ait Khabbash were integral to the rhythms of nomadic life. Moving with their families and herds across semi-arid plains, they participated in a variety of tasks, including fetching water, herding animals, weaving, and maintaining tents. These daily practices fostered deep networks of solidarity and interdependence. Work was rarely solitary. Mostly, it was a communal act that sustained both bodies and bonds. Through shared routines, women cultivated mutual support and a collective sense of belonging rooted in mobility and cooperation.

Today, those patterns are shifting dramatically. The decline of nomadism, accelerated by desertification and dwindling water resources, has led many families to settle in villages. Sedentarism, intensified by desertification and diminishing water, has coincided with higher poverty rates and unequal access to services such as schooling or healthcare, pushing families off their ancestral lands.

While sedentarism brings certain conveniences, such as access to schools and markets, it also disrupts longstanding ways of life and significantly alters the division of labor. For women, the move to fixed settlements has often meant reduced mobility and heavier domestic burdens. Water sources are increasingly distant, and as groundwater levels drop the task of collecting water, still largely conducted by women, grows more exhausting and time-consuming. Additionally, when men leave for seasonal work outside the village, women are left to carry on domestic chores, care work, and procuring water.

In light of this, the social fabric that once emerged through collective labor is unraveling. The sense of togetherness born from working side by side is being replaced by isolation. Where women once met at wells or during seasonal migrations, they now perform household tasks alone, behind walls that protect but also confine. These physical changes mirror broader social transformations, where cooperation has given way to fragmentation and communal resilience has been weakened.

One of the older women who now lives in Marrakesh commented on the nostalgia felt by her peers: "We miss meeting each other, spending time together and working together. We used to sit under an acacia tree and make *sksu* [a traditional Moroccan dish] using *tiwiza*'." Another woman, in her early thirties, who first moved with her husband to Ouarzazate and then Marrakesh, described missing the open spaces of the desert, hearing her language, and local produce such as barley and spices, notably cumin and henna, as well as dates, which she asks her brothers to bring with them whenever they visit. This longing for the rhythms of nomadic life—the unconstrained landscapes, shared laughter, and sense of purpose that came from living in harmony with the land—is shared by many others as well, revealing a profound emotional landscape. The memories of these women underscore the connections between environmental degradation and migration from ancestral lands to urban spaces, highlighting the repercussions on cultural and emotional aspects of life. The loss of mobility and communal connection marks a rupture in identity, leaving many women caught between past traditions and uncertain futures.

In Ait Khabbash, migration and sedentarization, whether a result of climate change, environmental decline, or socioeconomic factors, thus reveals itself to be a deeply gendered crisis. Women experience the burden of environmental degradation not only through physical labor but also through emotional and social loss. Their stories remind us that adaptation cannot be measured solely in infrastructure, largescale fixes, or policy terms. A holistic approach to sustainable responses must foreground gendered experiences to encompass not only heavier burdens on women but also uncertain futures marred by confinement and fragmented social bonds. Foregrounding women's experiences in responses to climate change means recognizing that resilience is as much about rebuilding relationships and cultural continuity as it is about securing water and livelihoods.

07

Lake Qaraoun and Migratory Pressures

Camille Ammoun

Climate change is rarely the single factor driving migratory pressures in vulnerable communities. Governance failures, pollution, economic crises, and conflict often interact with climate impacts in ways that are increasingly difficult to disentangle. The Litani basin in Lebanon offers a stark illustration of how these forces converge to shape patterns of mobility.

The Litani River rises near Baalbek and flows through the Beqaa Valley, before bending westward toward the Mediterranean where it meets the sea north of Tyre. It cuts across one of the most fertile areas of the Levant, forming a reversed L-shaped basin vital to Lebanon's agricultural and water systems. At its center lies the Albert Naccache Dam, which forms Lake Qaraoun, the country's largest water reservoir. Built in 1959, the dam was designed to support irrigation and hydropower and supply drinking water.

In this rural area of the Beqaa, multiple crises overlap today. These include repeated droughts, water pollution, the environmental impacts of endemic corruption, but also, at Lebanon's national level, economic collapse. The region also suffered heavily from bombardment during the conflict between Israel and Hezbollah in 2024, and in the most recent conflict of 2026. Such compounded pressures have reshaped livelihoods and narrowed the range of adaptation measures available to communities around the lake, including their mobility.

Quantifying the migratory pressures is difficult, however, as data for the West Beqaa are limited and population movements are gradual and overlapping. The area is characterized by layered mobility patterns that include the slow outmigration of local residents, the shifting movements of Syrian refugees, and today mass displacement because of the ongoing Lebanese conflict.

In summer 2025, Lebanon experienced its most severe drought on record following one if its driest winters in 40 years. Rainfall dropped by more than half, while reduced snowpack and earlier melt further constrained water availability. The Beqaa was among the regions hardest hit. Around a quarter of wells dried up and springs were depleted. Lake Qaraoun recorded its lowest water inflow since the construction of the dam, falling to 45 million cubic meters, which was far below the annual average of 350 million. This allowed the sunken 18th-century Saghbine Bridge to reemerge as a visible marker of hydrological stress. The bridge was also visible during the drought of 2014.

Droughts and desertification are widely recognized as powerful drivers of migration. Following the 2025 drought in the Beqaa, 15 percent of farmers were forced to abandon their crops. As one potato farmer in the region put it: "We're holding on because it's our land, and we don't want to leave it. But until when?"

The drought of 2025 amplified vulnerabilities across sectors, with cascading effects on communities. Declining agricultural output eroded already strained food security, while livestock losses and falling crop yields drove up food prices and deepened rural poverty. The sharp rise in the cost of hay and animal feed increased the price of meat and dairy products, further straining household budgets. While reduced hydropower availability constrained energy supply, growing water scarcity intensified social tensions. Protests, disputes, and occasional violence reflected the growing competition over unequal water access.

At the same time, Lake Qaraoun has faced severe environmental degradation. Untreated municipal and industrial wastewater, agricultural runoff, and solid waste have rendered large parts of the lake unsafe. High concentrations of bacteria, organic pollutants, and toxic metals have restricted its use, even for irrigation. In 2021, more than 100 tons of fish died in the lake, underscoring the scale of the collapse in the basin's ecosystem. Pollution has compounded the effects of drought, reducing incomes and living conditions, exacerbating public health issues, and acting as a multiplying factor for migratory pressures on affected communities.

Pollution in the Litani River basin is being driven by systemic governance failures that have allowed contamination to persist, despite repeated mitigation efforts. Fragmented responsibilities, weak enforcement, chronic underinvestment, and endemic corruption have eroded accountability, delaying projects, allowing for the misallocation of funds, and ensuring that projects are captured by vested interests. As the director general of the Litani River Authority, Sami Alawieh, has noted, "The main problem is that private interests are prioritized over the public interest." By deepening environmental stress in already fragile communities, the governance failures directly shape migratory pressures on the river's communities.

Lake Qaraoun Water Levels (July 2024 and July 2025)

Lake Qaraoun water level
July 23, 2024

Lake Qaraoun water level
July 23, 2025

Source: European Union, contains modified Copernicus Sentinel Data 2026

These institutional weaknesses have been further exacerbated by Lebanon's economic collapse. Since 2019, the sharp depreciation of the Lebanese pound has driven up the cost of agricultural inputs such as fuel, fertilizers, seeds, and pesticides, pushing many farmers back to subsistence and deepening poverty. In addition, access to loans became impossible due to the banking sector collapse. In response, migration patterns have shifted, with younger residents seeking work abroad or moving to cities, further weakening the Beqaa's productive base.

These structural pressures have been repeatedly intensified by conflict. During the 2024 war between Hezbollah and Israel, airstrikes and calls for evacuation forced around 1.2 million people to leave their homes across the Beqaa, South Lebanon, and Beirut's southern suburbs. A similar pattern has unfolded again in 2026. On April 4, the vicinity of Lake Qaraoun was struck several times. Villages such as Sohmor, Yohmor, and Mashghara were bombed by Israeli aircraft, and an Israeli drone hit a car 400 meters away from the Albert Naccache Dam. While the 2024 war disrupted agriculture by restricting access to land, damaging crops and assets, displacing farmers, and breaking input and labor supply chains, the 2026 war is likely to produce similar, if not more severe, effects.

While climate change, governance failures, pollution, economic collapse, and war all contribute to migratory pressures, their effects are so deeply intertwined that isolating any single factor risks confusing the dynamics at play. Migratory pressures are increasingly understood as the result of complex configurations of interdependent and interacting factors rather than the result of a single identifiable root cause.

There are no clear-cut solutions for this level of complexity, which is reflective of a broader global polycrisis, especially when conflict is added to the mix. However, the case of Lake Qaraoun, where these crises converge, suggests that the challenge is not to disentangle these pressures, but to understand how they reinforce one another, and to design policies that can manage their convergence. This requires moving beyond fragmented, sectoral responses and toward integrated approaches that address and link climate, water, agriculture, the economy, and corruption, while shifting from reactive crisis management to anticipatory governance that incorporates mobility into adaptation strategies.

08

Climate Worsens the Distress of Yemen's Muhammasheen

Musaed Aklan and Mohammad Al-Saidi

Yemen's climate crisis is unfolding inside a broader collapse of the country. Years of war, economic breakdown, damaged infrastructure, and policy failures have left Yemen acutely exposed to rising temperatures, erratic rainfall, flash floods, drought, and increasing water scarcity.

The frequency and intensity of heat waves and droughts have also been on the rise, while short downpours and tropical cyclones have become a recurrent phenomenon, causing flash floods that have damaged properties and infrastructure, while also eroding agricultural land. Torrential rains in mid-August 2025 alone affected more than 100,000 people. Illegal drilling continues and most aquifers are overexploited, while reduced freshwater recharge, the rise in sea level, and the unsustainable use of water for agriculture are causing salt intrusion in coastal basins, making groundwater less suitable for drinking and irrigation.

Meanwhile, conflict in the country has decimated water infrastructures, with Sanaa's water supply, for example, having dropped by 72 percent. Yemen's food supply, which depends heavily on imports, has been dramatically impacted by war and the militarization of the Red Sea. As a result of these compounded crises and mismanagement, the majority of Yemenis are food-insecure today. In 2025, about 83 percent of the population, or some 24 million people, required food aid amid widespread chronic malnutrition.

The impacts of these pressures are not evenly distributed. They most heavily affected communities are those that have already been pushed outside the country's systems of protection and representation. Among them are the *Muhammasheen*, literally "the marginalized," who stand out as one of the clearest examples of how climate shocks compound social discrimination.

The *Muhammasheen* occupy an especially underprivileged social category in Yemen. They are barred from tribal networks and have contested origins. Some say they descend from pre-Islamic African slaves or Ethiopian soldiers, while others say they have Yemeni roots. The term *Muhammasheen* is today the community's preferred term that has replaced the derogatory word *akhdam*, or servants.

Estimates vary wildly, but United Nations sources put the community at about 3.5 million people, or 10 percent of Yemen's total population. Official records largely ignore them, making precise figures difficult to establish. They live mostly in informal urban settlements around main cities, such as Sanaa, Ta'iz, Aden, Hudaydah, and Saada, as well as in some rural peripheries. They cannot own property due to social exclusion and lack of IDs, making their land rights precarious, while their homes are usually built on unregistered land. Many of their settlements are located on slopes, flood plains, or near waste sites. The lack of land tenure also means they cannot use land as collateral or sell property for capital. They maintain endogamous marriage practices. The *Muhammasheen* suffer from extreme socioeconomic deprivation and systemic discrimination—in work, marriage, and politics—leaving them with very low incomes, generating high levels of poverty, exacerbated by few safety nets. This social isolation, combined with entrenched prejudice, has left the community largely invisible in official records.

The *Muhammasheen* face formal and informal barriers at every level. Legally, Yemeni law does not explicitly forbid *Muhammasheen* from enjoying civil rights, but de facto discrimination is pervasive. The community is almost universally denied civil documentation—birth certificates, identification cards (IDs), or nationality papers. Around 78 percent of *Muhammasheen* adults lack national IDs, excluding them from state programs such as cash transfers, ration cards, and other programs and making their access to basic services far below national averages.

Only 9 percent of *Muhammasheen* households have piped water (versus 30 percent nationally), and only 42 percent have an in-home latrine. Many must buy trucked water or use communal pumps far from their homes. Waste management in their areas is absent, so that garbage in their neighborhoods is common. Compared to the national average, *Muhammasheen* areas are more exposed to environmental hazards, such as flood risks, polluted streams, and the burning of trash in open areas, while municipal services are largely absent in their areas. Ironically, the *Muhammasheen* make up most of the waste collection workers in other urban areas. Many homes lack connections to power grids, and those that have electricity often rely on generators or illegal hookups. Gas and fuel are purchased informally. There are no reliable statistics, but by analogy to water access, electricity coverage is probably well below the national level, which itself is under 50 percent in Yemen.

The *Muhammasheen* are also outside public health and education networks. Clinics and vaccination campaigns often bypass their communities. When they seek access to such services, they face discrimination or higher fees. With no national ID, they cannot access government health services and education. Small mobile clinics and awareness teams target their neighborhoods, but with very limited capacity. More than 60 percent of *Muhammasheen* children do not attend school. Only 20 percent of adults can read and write, compared to 60 percent among the general population. The factors leading to this outcome include unaffordable school fees, lack of documentation, long distances to schools, and other forms of discrimination.

Institutionally, the *Muhammasheen* remain largely unrepresented. Political parties and unions rarely engage with them, and the 2013 National Dialogue Conference included only one communal delegate among its 565 participants. Since 2015, relief agencies have also been slow to target the *Muhammasheen* specifically, often subsuming them under the broader category of the urban poor. To defend their rights, the *Muhammasheen* have organized themselves through rights advocacy groups, for example establishing in 1990 the Movement for the Defense of Free Blacks in Ta'iz Governorate, while the government later created government-affiliated organizations, such as the National Union of Muhammasheen, established in 2007. Some organizations have helped eligible *Muhammasheen* obtain IDs, but many still slip through the cracks. Overall, however, their living conditions have not improved markedly through the years.

Climate shocks have deepened this already dire situation. Many *Muhammasheen* settlements are located in flood-prone areas, including dry riverbeds and *wadis*, where heavy rains wash sewage and uncollected waste into camps and destroy fragile homes. Torrential downpours also carry waste from nearby dumps into villages and leave displaced families trapped in mud.

Drought has had the opposite but equally damaging effect, reducing access to clean water and forcing households without piped connections to pay for costly tanker water or queue up at distant water sources. In neighborhoods without sanitation networks, raw sewage often flows in the open and toxic leachate seeps into groundwater, while uncollected garbage is frequently burned, creating respiratory risks. The consequences—diarrhea, cholera, and respiratory illness—hit the poorest families hardest.

Addressing this socioenvironmental inequality requires targeted and sustained interventions. A first step is legal inclusion, through a national program to provide the *Muhammasheen* with birth certificates and identity documents. This should be accompanied by investment in water, sanitation, and waste services in *Muhammasheen* neighborhoods. Mobile health and vaccination campaigns must explicitly reach these communities. The authorities should also provide flood-risk mitigation measures, including drainage and safer shelters. Such efforts need to be reinforced by legal aid, penalties to curb discrimination, and stronger safeguards against the obstruction or diversion of aid.

Despite current challenges, partial implementation of these recommendations remains possible through humanitarian actors, local authorities, and community initiatives. Incremental efforts can still achieve meaningful progress and, over time, may help support broader institutional recovery.

08

Music, Memory, and Identity in the Afro-Iraqi Community

Zeinab Shuker

Performing arts play a significant role in the culture of the Afro-Iraqi community of southern Iraq—in other words, Iraqis of African descent. Many of its members incorporate music and dance into their daily lives, and some even pursue careers in entertainment. To understand the important role of music, we must consider it within the broader context of the group's sociopolitical and economic marginalization. Crucially, for Afro-Iraqis, music preserves memory and collective identity. Additionally, it serves as a vehicle for economic and class mobility.

In her work on the community and its identity, Taif Alkhudary argues that Afro-Iraqis have had to contend with Iraqi society's "non-memory" of their origins and background. This manifests itself in scant documentation of the history of enslaved Africans brought to Iraq centuries ago, a studied avoidance of the way race has shaped Afro-Iraqis' identity over time, as well as persistent political, economic, and social discrimination. Music derived from the group's African roots counters the phenomenon. Most significantly, this form of remembering occurs outside existing structures of domination, such as the state or traditional social norms, that have been instrumental in fostering the widespread non-memory of Afro-Iraqis. It is pushback against the erasure of how they arrived in Iraq and the often disadvantaged sociopolitical and economic positions they have occupied since.

Music also becomes a pathway of spirituality and healing for the community. An Afro-Iraqi woman interviewed in December 2025 mentioned that instruments such as the tambura—which has been passed down through the generations—are used during a gathering called Al-Mekayyad to exorcise an underworld spirit, or *zar*, from people seeking treatment. The battle between good and evil spirits can take several days to conclude. The origin of the *zar*, which community members argue is distinct from a genie, or *jinni*, can be traced to Sahelian culture and was brought to the region by enslaved people from the African continent.

Mekayyad rituals—which are rarely open to those beyond the Afro-Iraqi community—involve dance, music, and drumming. Many of the dances and instruments have African origins, and some of the songs are sung at least partly in African languages, along with Islamic chants and prayers in Arabic.

There are several ways to perform Mekayyad by groups that often compete with each other and specialize in certain illnesses or concerns. The aforementioned interviewee even claimed that certain groups are known not for helping people but rather for communicating with, and seeking assistance from, harmful spirits. From the color of a flag atop the roof of a house during the ceremony, a community member can identify which group is gathered at the location and for what purpose.

Beyond the Mekayyad rituals, music is a source of connection, identity, and communal belonging. Mishal al-Ziyadi, an Afro-Iraqi who started his own folkloric band, says that he and other members of the community learned the songs he performs at a young age. The men in the family play at weddings and festivals, and the children grow up both listening to and identifying with the music. Ziyadi, who was born and raised in Zubari, Basra Governorate, says his dream is to teach his children their heritage through the connection they have to their community and its music. Today, this connection extends beyond Basra and even Iraq. In his compositions, Toronto-based musician Ahmed Moneka, an Afro-Iraqi descendant of the enslaved Africans who launched the Zanj Revolution (869–883) in the area around Basra, creates vibrant Afro-Sufi fusion with influences from Iraq, Kenya, and Canada.

Beyond the safeguarding of collective memory and identity, musical entertainment can also serve as a refuge-of-sorts from bigotry. Paradoxically, though interviewees often deny the existence of racial discrimination in Iraq, they provide examples of racially tinged incidents to which they or their children have been subjected. Several mentioned derogatory language and even threats directed at their sons and daughters by classmates at school, leaving them alienated and adversely affecting their academic performance. Others pointed out that while employment in the public sector is accessible to members of the group with the requisite education and connections, private-sector employment, especially front-facing positions, remains limited due to race-based beauty standards.

Ironically, because the entertainment sector is frowned upon by many in southern Iraq for reasons of social conservatism, it has served as a source of employment for Afro-Iraqis. Indeed, performative arts, especially music, not only provide income to group members but in certain instances pull them out of a cycle of poverty and marginalization toward recognition and even stardom. An entertainer such as Anod al-Asmr, for example, has become well-known in Iraq's contemporary music and club scene due to her catchy songs and beautiful, unique voice.

However, musicians and performers in general often face significant challenges. In November 2025, the Iraqi singer Mohammed Abdel Jabbar—who is not an Afro-Iraqi—was set to perform in Basra. Despite tickets for his concert having sold out, the show was canceled due to opposition by religious clerics who mobilized against it, claiming dancing and music are against the city's Islamic and Husseini identity.

This was not a rare occurrence. The newfound, post-Baath dominance of traditional and religious authorities over the political and social life of southern Iraqi cities, including Basra, has significantly reshaped their cultural identities. The effort to anathematize the performative arts arguably hits Afro-Iraqis harder than others. Yet it is but one obstacle among many that the community faces in challenging the relegation of its history and identity to "non-memory."

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Notes

1 Interviews conducted between May and June 2025.

2 Names have been changed.

3 Author interview, conducted in Draa-Tafilalet in June 2025.

4 Author interview, conducted in Draa-Tafilalet in June 2025.

5 Author interview, conducted in Draa Tafilalet in June 2025.

6 Vartan Manoug Amadouny, "The British Role in the Development of an Infrastructure in Transjordan During the Mandate Period, 1921–1946," Ph.D. dissertation, University of Southampton, 1993, page 12, https://eprints.soton.ac.uk/462123/1/381419.pdf.

7 Tariq Tell, *The Social and Economic Origins of Monarchy in Jordan*, New York: Palgrave Macmillan, 2013, pages 79–80.

8 Tariq Tell, "The Social and Economic Origins of Monarchy in Jordan," page 93.

9 Tariq Tell, "The Social and Economic Origins of Monarchy in Jordan," page 95.

10 Focus group discussion facilitated by the authors, with eight male participants aged 45–70, from Deir al-Kahf villages, Deir al-Kahf Community Center, Jordan, May 17, 2025.

11 Philip Robins, *A History of Jordan*, Cambridge: Cambridge University Press, 2019, page 56; Tariq Tell, "The Social and Economic Origins of Monarchy in Jordan," page 120.

12 Tariq Tell, "The Social and Economic Origins of Monarchy in Jordan," page 127.

13 Tariq Tall, "The Politics of Rural Policy in East Jordan, 1920–1989," in Martha Mundy and Basim Musallam (Eds.), *The Transformation of Nomadic Society in the Arab East*, Cambridge: Cambridge University Press, 2000, pages 90–98.

14 Authors' interview with the head of the Deir al-Kahf Community Center, May 15, 2025.

15 Focus group discussions, May 17, 2025.

16 Focus group discussions, May 17, 2025.

17 Focus group discussions, May 17, 2025.

18 Authors' interview with the head of the Deir al-Kahf Community Center, May 15, 2025.

19 *Ibid*.

20 *Ibid*.

21 Focus group discussion facilitated by the authors, with eight male participants aged 45–70, from Deir al-Kahf villages, Deir al-Kahf Community Center, Jordan, May 17, 2025.

22 Authors' interview with a local man in his sixties from Mafraq at the city's main community center, Mafraq city, May 15, 2025.

23 Focus group discussions, May 17, 2025.

24 Focus group discussions, May 17, 2025; Focus group discussion facilitated by the authors, with 7 male participants aged 18–25, from Deir al-Kahf villages, Deir al-Kahf Community Center, Jordan, May 17, 2025.

25 Focus group discussions, May 17, 2025; authors' interview with the head of the Deir al-Kahf Community Center, May 15, 2025.

26 Authors' interview with the president of Mafraq city's main community center, Mafraq city, May 15, 2025.

27 Interview with thirty-three-year-old male bidun in Sulaibiyah, December 2025.

28 Interview with twenty-two-year-old male bidun in Sulaibiyah, December 2025.

29 Interview with male bidun head of household, Sulaibiyah, December 2025.

30 Interview with male bidun head of household, Sulaibiyah, December 2025.

31 Interview with male bidun head of household, Sulaibiyah, December 2025.

32 Interview with twenty-two-year-old male bidun, Sulaibiyah, December 2025.

33 Interview with female bidun college student, Taima, December 2025.

34 Interview with twenty-seven-year-old female bidun, Sulaibiyah, December 2025.

35 Interview with male bidun in his mid-forties, Sulaibiyah, December 2025; also interview with forty-year-old female bidun, Taima, December 2025.

36 This section is based on interviews with thirteen women and seven men, including one non-Afro-Iraqi man, divided across several focus groups, on December 17–22, 2025, within the Afro-Iraqi community in Basra City. The subjects represented a range of ages, educational backgrounds, occupations, and political leanings, with the youngest aged fourteen and the oldest aged seventy. Two of these subjects were candidates in the 2025 Iraqi elections.

37 Focus group with two Afro-Iraqi women on December 17, 2025, Basra, Iraq.

38 Focus group with two men and three women on December 19, 2025, Basra, Iraq.

39 *Ibid*.

40 *Ibid*.

41 *Ibid*.

42

43 Focus group with three men on December 18, 2025, Basra, Iraq.

44 Focus group with one man and four women on December 18, 2025, Basra, Iraq.

45 Interview with one woman on December 20, 2025, Basra, Iraq.

46 *Ibid*.

47 *Ibid*.

48 The topic came up in all interviews conducted on this matter.

49 Focus group with two men and three women on December 19, 2025, Basra, Iraq.

50 Focus group with three men on December 18, 2025, Basra, Iraq.

51 *Ibid*.

52 *Ibid*.

53 *Ibid*.

54 Interview with a non-Afro-Iraqi intellectual based in Basra on December 19, 2025, Basra, Iraq.

55 Focus group with two men and three women on December 19, 2025, Basra, Iraq.

56 Focus group with one man and four women on December 18, 2025.

57 Fieldwork was carried out across six communes of the *daïra* of M'chedallah: Aghbalou, Chorfa, M'chedallah, Saharidj, Ahnif, and Ath Mansour—as well as in three communes located at the frontier between the two wilayas—Tazmalt, Boudjellil, and Allaghene. Sitting at the intersection of mountain and valley farming systems, this area captures the policy challenges facing Kabyle agriculture more broadly.

58 As a senior hydraulic engineer put it in an interview, the young "no longer accept a job where their hands will touch dirt." Author interview with engineers of the M'chedellah subdivision, February 2026.

59 Megdouda Smail, Zoubir Boubaker, Mohamed Sbabdji, Habib Mouaissa, and Bimare Kombate, "Detecting Land Use/Land Cover Changes and Forest Degradation: A Case Study of the Lower Soummam Valley, Northern Algeria," *Journal of Forest Science* 70, no. 3 (2024): 122–134.

60 The 2026 Finance Law imposes a fee on pasture use, transforming what had functioned as a common-pool resource into a commodified one (article 146 of Finance Law no. 25-17 for 2026 the amending article 112 of Finance Law no 89-26 of 1989). The fee applies to herders that want to bring their animals specifically into forests that are under state control or in a controlled area.

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